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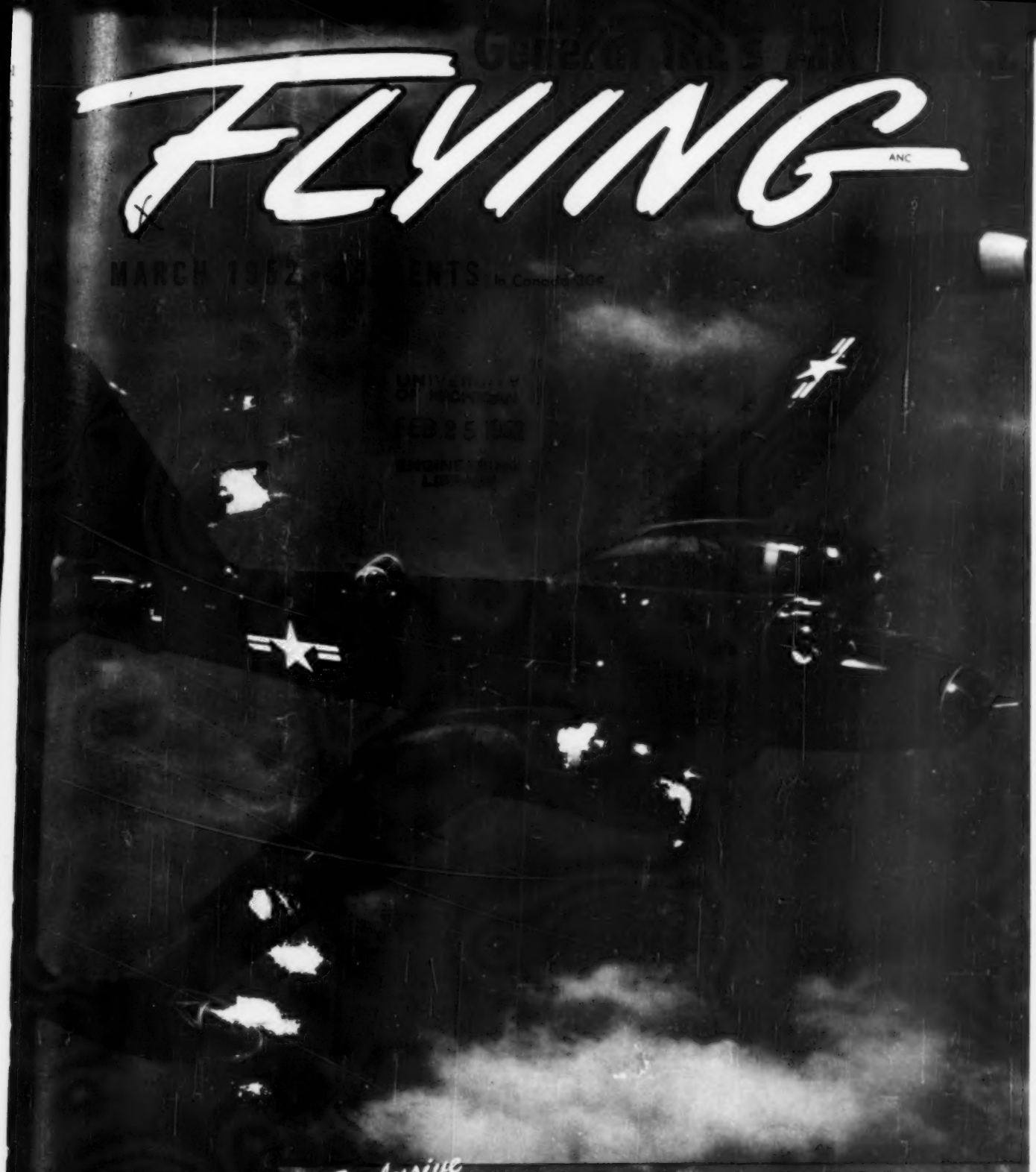

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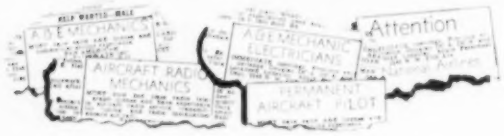

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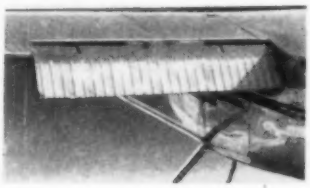

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WILLIAM A. LANDAU, 38-year-old insurance salesman of Des Moines, Iowa, used to drive 35,000 fatiguing miles a year, found that he still couldn't solicit business further than 100 miles from home. Now, he flies a fast Cessna 170, reports that the Cessna has helped him find many new prospects . . . some, 200 miles away! He likes his Cessna's roominess, ease of handling, economy and practicality. But most of all, he's happy because the Cessna has more than doubled his territory and expanded his business, while relieving him of tedious highway travel.

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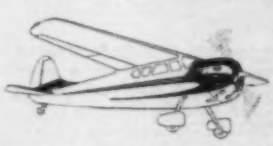

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CONTENTS MARCH, 1952

AN EDITORIAL: What Has Happened to America's Youth? ... Gill Robb Wilson ... 10
General Ike's Air Force ... James L. H. Peck ... 11
CAA's Role Today ... 14
The Hydra-headed Delta ... 16
Give America's Youth Aviation Education ... Congressman Henry J. Latham ... 17
Ceiling Zero ... 20
Strange Fields' Take-Off ... Wesley Neal ... 22
Bailing Wire Landing System ... J. W. Huttig ... 24
Alarm-clock Navigation ... Alice S. Fuchs ... 26
The Farmer Takes a Tour ... Charles F. Mozer ... 28
The P2V Neptune ... 30
Blimp Makes a Come-back ... James H. Winchester ... 32
You Can Survive ... Harald H. Prommel ... 34
Have You Seen? ... 35
I Learned About Flying From That! No. 146 ... David Youngdahl ... 38

SHORT FEATURES

Military News ... 9
AOPA News ... 39
A Flying Tip ... Jackson C. Stear ... 40
The Mail Box ... 41
Fifteen Years Ago ... 43
Can You Spot Them? ... 45
Notes on Civil Flying ... 46
Flat Spins ... Harold Helfer ... 52
Logging Time ... Hy Sheridan ... 51
Do You Remember . . .? Roscoe Turner ... Bill Bullock ... 53
Pilot Aids ... Bob Blatt ... 55
The Library ... 61
Civil Air Patrol Wing Talk ... 62
Flying Farmers ... Bill Renshaw ... 64
PHOTO CREDITS ... 60

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MILITARY NEWS

XB-52 ROLLED OUT

Under cover of darkness and heavy camouflage, the nation's first all-jet heavy bomber was rolled out of an aircraft factory at Seattle, Wash., on November 29. The XB-52's manufacturer, Boeing Airplane Company, stated that it would be some time before preliminary tests would be completed and the big bomber would make its maiden flight.

Stationary tests are being planned and would take considerable time before taxi tests would even be attempted.

It has been indicated that the XB-52 is similar in appearance to the B-47 medium bomber, six-engined swept-wing design in the 600 m.p.h. class.

Secretary of the Air Force Thomas K. Finletter disclosed that the Air Force would like to move quickly into production of the heavy bomber. He hoped to cut short the usual months—and sometimes years—of testing experimental models. A production contract has already been signed with Boeing.

TRANS-SONIC PLANES SOON

Harold W. Sweatt, president of Minneapolis-Honeywell predicts that the next ten years will see the development of trans-sonic airplanes. He feels it will turn out to be the greatest impetus to the American standard of living yet seen.

He stated: "The demands of flight beyond the speed of sound are forcing us to develop entirely new resources of stronger metals and other materials which have yet to find their way into the consumer products of the future. The constantly rising standards of production demanded by our new adventures in the air are being taught even more widely through the medium of the vast industrial mobilization and subcontracting program now getting under way."

ATOMIC ENGINE BEING READIED

The Air Force has awarded a contract to Pratt & Whitney for work on an atomic aircraft engine. The U.S. Atomic Energy Commission will cooperate in consideration of the nuclear energy phase of the work.

RESERVE OFFICERS WEATHER SCHOOL

A one-year course in meteorology at one of several civilian universities, offered at government expense under the Air Weather Service career program, has been opened to applicants in several categories. Sole basic requirements are a bacclaureate degree and a USAF lieutenant's commission.

College graduates, USAF lieutenants on either active or inactive duty, who have obtained credits for mathematics through integral calculus and for one year of college physics may apply for immediate attendance.

Near-graduate AFROTC and USAF OCS students who have fulfilled the education requirements may also apply. All applicants are selected on a best-qualified basis.

METAL SHORTAGE SOLVED

In order to conserve stocks of highly strategic metals, Boeing is using plastics in greater quantity. The plastics, strong enough to substitute for aluminum alloys, are already being used as the standard production material for many parts of the B-47 *Stratojet*.

An extra advantage of the substitution, Boeing feels, is that plastics forming process requires a relatively small outlay of tooling, one of the most critical items in short supply today.

Principal plastic in use is Fiberglas combined with polyester resin, a coal by-product. Thousands of fine, glass strands bonded by the resin form the plastic structure which resembles concrete reinforced with steel.

COMPASS SWINGER

J. E. Surratt, Jr. of the Inspection Department at the Temco developed an inexpensive device that reduces the man-hours required to swing compasses on F-47 *Thunderbolts* and other fighters by more than 50 per cent.

The device consists of a mirror on an arm which is attached to the pilot mast by means of spring clamps. The mirror

holder is self-aligning so that it can be moved from ship to ship without adjustment.

Prior to Temco's adoption of the device, two men were required for the compass swinging operation—one in the cockpit to read the compass, and the other on the wing tip to check the headings on the compass rose. Now the man in the cockpit can see directly what the man at the tip formerly checked, thus eliminating the need for the second man.

AIR-SEA RESCUE IMPROVED

Douglas feels that their radio controlled raft may well revolutionize air-sea rescue operations. The aircraft company has developed this raft in conjunction with the Air Material Command.

The carbon-dioxide inflated rubber life raft is contained in an aluminum

alloy cylinder which may be launched either from an airplane or from any ocean craft equipped with torpedo tubes.

After striking the water, the torpedo-sized cylinder automatically expands into a raft 22 feet long and eight feet

wide. It is equipped with a four-cylinder inboard engine, fuel for 300 miles of cruising, a remote control radio system, two way radio communication set, heating system, automatic pilot and food and survival equipment to last eight occupants five days.

The plane that launches the raft will be able by radio controls to start or stop the engines, steer the boat to survivors on the sea or set the boat on any desired compass course.

The Douglas announcement states that all phases of the operation were successful during the first tests.

FIRST FLIGHT FOR F7U-3

Assembled Navy and company observers at Hensely Fields saw a larger, better-equipped, harder hitting version of the original Cutlass, as the F7U-3

(*Continued on page 60*)

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CONTENTS

MARCH, 1952

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MILITARY NEWS

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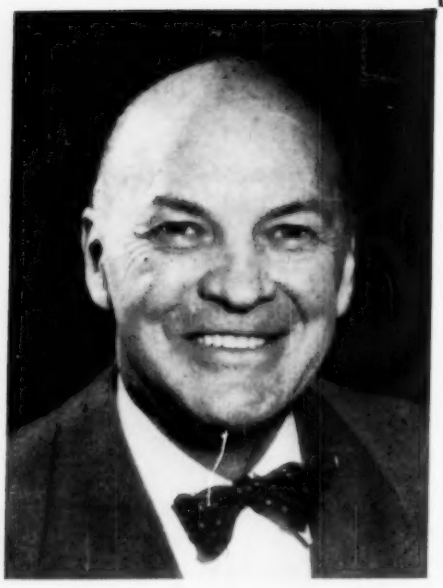
AN EDITORIAL



What Has Happened to America's Youth?

Has American aviation lost the American boy?

Five years ago the Civil Aeronautics Administration issued 193,000 student pilot permits. Last year the number had dwindled to 48,000.

In 1947 more than 120,000 private pilot licenses were issued to budding aviators. In 1951 the number was down to 23,800.

Can American airpower survive without youth? Are the foundations of American air supremacy crumbling?

In 1946 the aircraft industry produced 34,563 personal aircraft. Last year the number of such planes produced was shrunk to 2,250 and only 600 of these were one- and two-place light planes.

Almost every community of any size in the Country has an airport or a flight strip. Airways and aids to cross country flying were never so numerous as now. Weather information is reaching continuously new high standards of accuracy and dependability. Regulations are not a barrier and safety devices have been stressed.

Yet in spite of these facts the number of certificated flying schools has dwindled in five years from 3,078 to 1,054. As late as last October 76 community flight training schools closed their doors.

Reasons for these conditions are well known. The limited finances of youth can purchase less and less flight training due to high costs of planes, fuel, hangarage and instruction. The reservoir of youth which would seek training is absorbed in the program of Universal Military Service.

Yet knowledge of the causes which undermine American airpower at its source—American youth—is not a remedy for the condition.

It is well and good to note that personal aircraft are finding an increasing market in agriculture and in corporation activities. This is a major contribution to the total of national airpower.

But it is not the answer to the dwindling volume of youth flowing into American aviation.

Simplification and economy of the helicopter will in time make it a vehicle of private transportation.

But again this is not the answer to the scarcity of the American boy and girl on thousands of community airports and flight strips.

Public education is increasingly stressing the importance of aviation in its efforts to adjust youth to the problems of the modern world. But once more this does not provide the answer to the depopulation of community airports and the increase of hot rods on the highways.

The writer lays censure at the door of none but poses the question: "Have we taken our eye off the boy?" In our search for airpower to keep us secure, to raise our standard of life and to chase the flickering light of a brave free world, have we crowded the youngster out of the sky?

At this question the leadership of the United States must take a long hard look. Our Community airports are sterile of youth. Is this healthy? Is it wise? Is it safe?

Gill Robb Wilson

Gill Robb Wilson
Editor and Publisher of FLYING

FLYING
VOLUME 50, NO. 3
MARCH, 1952

General Ike's Air Force

The Allied Air Forces in Central Europe are doing General Eisenhower and the UN proud.

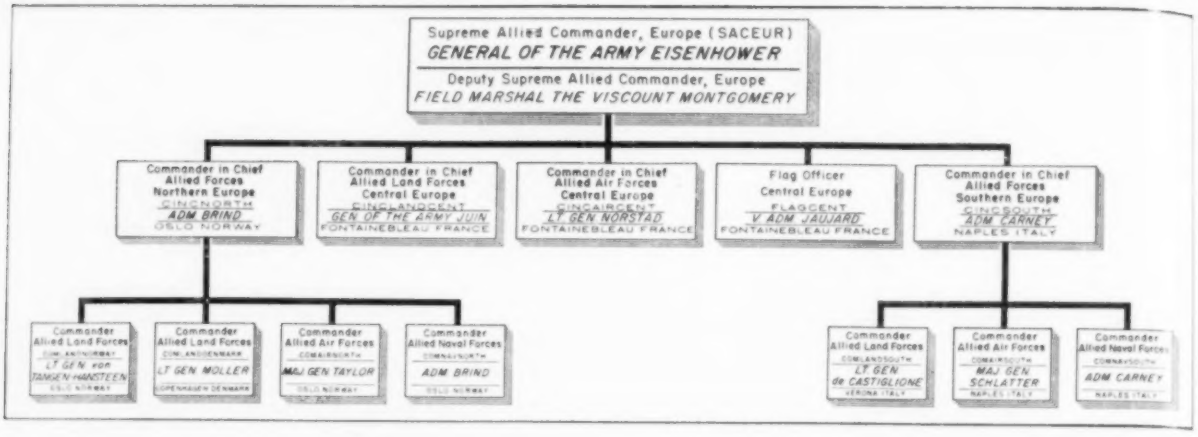
By JAMES L. H. PECK

GENERAL Ike's Air Force is barely a year old. But the Allied Air Forces in Central Europe (AAFCE) is already an effective fighting force.

The North Atlantic Treaty Organization Supreme Commander and his brilliant young air executive, Lieut.-Gen. Lauris Norstad, surmounted economic ills, military apathy, international jealousies, barriers of languages and customs, and lagging production at home and abroad to whip into shape the now-integrated NATO air arm. Despite the additional technical limitations of obsolete airplanes, scarcity of modern airdromes, shortages of trained ground crewmen, and unstandardized equipment, they even put two subordinate regional commands into operation in the Northern Air Forces and Southern Air Forces.

Moreover, Ike and Norstad lost no time in getting their charges into the air for a series of tactical scrimmages. These integrated defensive operations began last June—barely five months after AAFCE was activated—and continued through September 1951. Everything took wing from war-weary *Spitfires* and *Thunderbolts* to spanking new F-84E *Thunderjets*. Airmen of eight NATO nations participated in the maneuvers which were designed to test the ground-air liaison in Central Europe. These were called *Operation Counterthrust* and *Operation Jupiter;* three other exercises—designated *Ombrelle, Cirrus,* and *Pinnacle*—were held concurrently to test Continental and British defense systems. Cirrus was the first

NATO'S DEFENSIVE AIR STRENGTH (excluding USAF) 3069 FIGHTERS, (1758 Jets; 1311 Piston)



MDAP training emphasizes individual instruction to members who in turn instruct their respective countrymen in use of the American aircraft, such as the P2V-5, and the latest weapons.

The F-86 *Sabre* is important as a NATO interceptor. Besides the US, various European countries will produce them using British engines. Canada has also received contract licenses.

in which all three elements of AAFCE flew together and the first operation which involved Britain's defense system in a Continental exercise.

"The purpose of the maneuvers," explained one officer, "was not to see how big a 'score' we could run up. We wanted to find out how well—or how badly—the 'teams' functioned together; see how this integrated command scheme worked out with NATO air and ground units, and determine what deficiencies existed in the communications set-up for control and reporting. We found out exactly what we wanted to—and the operations, therefore, were eminently successful."

On paper, however, General Ike's job appears formidable. To meet any Soviet move westward, tactical experts think in terms of at least a two-to-one NATO air superiority—plus the tactical A-bomb—to compensate for the superior Red Army strength on the ground. Excluding the American aircraft of USAFE or the U.S. Navy's 6th Fleet—since figures on these units are classified—here is what NATO could put into the air right now, according to unofficial but highly reliable estimates:

First up against the Reds would be Denmark's two or three squadrons of *Meteor* 4s and *Spitfire* 9s—a mere, pitiful 36 aircraft.

These would be reinforced promptly by the RAF's 2nd Tactical Air Force based in Germany. Second TAF could raise a mixed wing of *Vampire* 30s and *Meteor* 9s, a wing of *Spitfire* tactical reconnaissance craft, and a wing of *Mosquito* tactical bombers. With a ratio of three 12-plane squadrons per wing, this RAF force would include 108 aircraft, plus reserves of four planes per squadron. (Further reinforcement would, of course, be provided by USAFE fighters of our 2nd Air Division as they rose to the occasion.)

The Netherlands could raise a squadron of new *Thunderjets*, two or three squadrons of *Meteor* 4s and 8s, and two or three more of *Spitfire* 19s. Dutch airmen fly 12 planes to the squadron. This would provide, at best, 84 aircraft plus reserves.

Norway would strike at the Red right flank with six *Vampire* 3 squadrons, two or three units of *Spitfire* 9s, and two fighter-bomber squadrons of *Mosquito* 6s. This sums up to 132 operational craft, plus the reserves required to sustain this force in action.

Belgium's airmen would be aloft, meanwhile, with 10 squadrons of *Meteor* 4s, perhaps a squadron of just-received *Thunderjets*, three squadrons of *Mosquito* 30 night fighters, and two units of *Spitfire* 14s. Of the six reserve squadrons which exist on paper, the Belgians could raise perhaps two or three at this writing. Like the RAF, the Belgian Air Force operates 12 planes to the squadron, providing 132 jets and less than 100 piston fighters.

France's *Armée de l'Air* could commit to battle 20 squadrons of *Vampire* 5s, two squadrons of *Thunderjets*, and two units of F-80-Cs. At a ratio of 25 planes to the squadron, the French would have 575 jet fighters, plus the reserves necessary to keep in operation this number of aircraft. It appears doubtful, however, that all 24 squadrons could operate today at full strength. There exist on paper still another 25 reserve squadrons of obsolete F-47 *Thunderbolts*. But France could man only half of these because of the sad state of disrepair into which

NATO'S DEFENSIVE AIR STRENGTH (excluding USAF) 3069 FIGHTERS, (1758 Jets; 1311 Piston)

Table shows only defensive type aircraft; it does not include other MDAP planes such as Stratojet, Canberra, or Neptune.

AIR FORCE	UNITS AVAILABLE	DEFENSIVE FIGHTER TYPES (Jets in Bold Face)	DEFENSIVE FIGHTER STRENGTH TODAY	U.S. MDAP AID
USAFE (12th Air Force)	2ND AIR DIVISION (Germany) 3RD AIR DIVISION (Britain)* 2 Fighter-Bomber Wings 1 Fighter-Escort Wing 1 Air Depot Wing 1 Fighter-Interceptor Wing 1 Troop Carrier Wing 3 SAC Medium Bomb Grps. 1 Search-Rescue Sqdn. 1 Air Depot Wing 1 Special Mission Sqdn.	**F-86E** **F-84E**	Classified	
RAF	3 Fighter Grps, Regular 3 Overseas Command Grps. 2 Bomb Grps, Regular 25 Grps. various commands, Reserve 2 Coastal Command Grps, Regular	**Meteor 4-8-9** **Vampire 5-30** **DH Venom 2** **VA Swift** Mosquito 36	228	70 B-29 500 F-86E‡§
FRENCH	15 COMBAT GRPS. 45 Fighter Sqdns.	**Vampire 5** **F-84-E** F-47-D-N	855	60 F-80C F4U-7‡¶ 100 F-84E
BELGIAN	12 Fighter Sqdns, Regular 6 Fighter Sqdns, Reserve 3 Night Fighter Sqdns, Regular	**Meteor 4** Spitfire 14 Mosquito 36	1024	100 F-84E‡
RCAF	3 Fighter Sqdns (Britain) 10 Fighter Sqdns, Reserve 3 Fighter Sqdns, Regular	**F-86E** F-51H **Vampire 5**	318	F-86E§
DUTCH	7 Fighter Sqdns.	**Meteor 4-7** **F-84E** Spitfire 19	108	100 F-84E‡ T-33A¶
DANISH	3 Fighter Sqdns.	**Meteor 4** Spitfire 9	48	50 F-84E‡
NORWEGIAN	9 Fighter Sqdns. 2 Fighter-Bomber Sqdns.	**Vampire 3** Mosquito 6 Spitfire 9	180	100 F84E‡
ITALIAN	2-3 Fighter Sqdns.	**Vampire 5** Spitfire 9	50†	50-100 F-84E‡
TURKISH	9 Fighter Sqdns.	Spitfire 9-19 Mosquito 6 F-47-D	144	F-84E‡¶
GREEK	3 Fighter Sqdns.	Spitfire 9	48	

* Bomber units and some fighter units rotate every 90 days
† Italy limited by World War II Treaty to 350 military planes
‡ Deliveries incomplete as of January 1, 1952
§ Some or all to be built in Canada under license
¶ Number indeterminate

Estimates do not include numerical strength of USAFE or NATO naval air arms. Additional USAFE light bomber fighter wings recently stationed in France.

they have fallen for lack of spare parts—at best about 325 flyable F-47s.

The RAF would take off with three regular groups of Fighter Command *Meteor* 8s and brand-new V-A Supermarine *Swifts*. Reserves of the Royal Auxiliary Air Force could muster quickly three or four wings of *Meteor* 4s and *Vampire* 3s. They could fly, also, about three wings of *Hornet* 3s, one or two wings of new N.F. 11 night fighters, and one or two wings of *Mosquito* 36s. This British force totals up to 880 aircraft, including the required reserves but not including the aforementioned 2nd TAF units in Germany. Of the RAF home force, some 250 are piston-engined fighters.

Canada would complement this UK forces with two or three *Sabre* squadrons based in the British Isles (with seven or eight more squadrons to be contributed by the RCAF later). One RCAF squadron of *Vampires*, based in the UK for several months, is being refitted with *Sabres*. To the defense of the Continent and/or the British Isles, the Canadians could raise, then, some 50 F-86Es, plus reserves.

On the southern flank, Italy might take to the air with two or three squadrons of *Vampire* 5s and *Spitfire* 9s. And in the far north, Sweden straddles the diplomatic fence with the third largest air force in Europe. She has some 800 operational aircraft, including numbers of the thoroughly modern *Saab* J-29 jet fighters. Like it or not, Sweden might have to throw in with NATO for her own salvation—and there are elements in her government which favor this course of action. In any case, her air potential—not included in this estimate—would be most welcome to Norstad. Under the provisions of the MDAP (Mutual Defense Assistance Program), the small forces of Denmark, Italy, Turkey and Greece, will soon be bolstered considerably by shipments of *Thunderjet* fighters and technical aid.

Right now AAFCE could raise *under the most favorable conditions* 3,069 fighters—plus a negligible tactical bomber complement—for the immediate defense of the West. Of these 1,758 would be jets, and the remaining 1,311 piston-engined fighters of obsolescent or obsolete design.

This round-up is optimistic.

Those who may be disappointed will not be comforted in the further knowledge that only 1,053 planes could participate in *Operation Cirrus*. Less than 500 of these were jets, and many of these fighters were American.

A considered point, however, is that a year ago, when Generals Ike and Norstad formed AAFCE, even these workers of military miracles could not have raised half this many fighters. The exact number of aircraft for which we are striving as a NATO target force has never been revealed. But the experts have spoken in general terms of seeking a two-to-one air superiority. Some experts hold that the Soviets would not strike with less than 6,000 planes to cover and run in- (*Continued on page 63*)

The CAA'S Role Today

In order to clarify and consolidate CAA's programs for its readers, FLYING presents on these pages a special interview with Charles F. Horne, CAA Administrator. Questions for the interview were prepared by FLYING's editors and members of its Editorial Advisory Board, with particular emphasis placed on national defense and its effects on CAA.

Q. In view of the probability that a war with Russia would include air attacks on our major centers of population, what action is being taken by CAA to generate the civil air lift capacity essential to rescue, relief and support of military action?

A. Recognizing the abilities of the civil airplane in emergency uses, particularly in the event of a disaster such as bombing of our cities, the CAA backed an intensive study and cataloging of such facilities when it was proposed by its Aviation Development Advisory Committee in 1950. This study was the basis for several actions, including a CAA drive for enough materials to produce at least 3,500 civilian planes a year; issuance of identification cards for civilian pilots to "keep them in the air;" and cooperation with the military in establishment of Air Defense Identification Zones for necessary supervision of civilian flying in critical areas. In 1951, the CAA coordinated and helped to complete a suggested standard plan for mobilization of civilian flyers and planes for use in emergencies. The plan was circulated to all states. Remembering the sudden and arbitrary grounding of civilian planes at the beginning of World War II, the CAA has been working with military and civilian defense authorities to keep the facts of the readiness and ability of these planes and pilots in all the planning for emergency action. Most important is the fact that continuous liaison between state aviation officials, pilot bodies, and the civilian defense authorities is being maintained by the Office of Aviation Development of the CAA, to which this duty has been specifically assigned. All elements of aviation industry have greatly assisted in various phases of mobilization planning.

Q. Do you subscribe to the belief that air transportation has become a necessary factor in the survival of industry in modern warfare?

A. The present tempo of American industry could not be maintained without air transportation, whether during peace or war. Industry has learned that top-level talent can be spread effectively over wide areas by taking advantage of the speed inherent in air transportation. This is demonstrated not only by general business use of commercial air transportation, both passenger and cargo, but also by the growing fleet of executive aircraft.

Q. Is the CAA prepared with a mobilization plan?

A. Yes. The CAA has complete plans for carrying on its operations under war conditions, including a "line of succession" for each office in case of disaster, and duplication of important records at a selected "emergency headquarters" outside of Washington. Joint planning and coordination with defense agencies are established. Mobilization of aviation as a whole will be conducted under a plan developed by a National Securities Resources Board task force and is being perfected by the Defense Air Transport Administration.

Q. In the event of national emergency, what restrictions to normal air travel may we expect?

A. Few, if any. There is a much better appreciation by the military services of the value of civil aviation under wartime conditions than existed during World War II. We anticipate no wholesale groundings of civil aircraft except under actual enemy air attack conditions. Even then, the groundings will be the minimum necessary to meet the particular combat situation.

Q. How successful are the Air Defense Identification Zones (ADIZ) and are they serving a useful military purpose?

A. The ADIZ requirements are intended to meet national security needs with a minimum of inconvenience to civil aviation. Pilots have been very cooperative in filing flight plans, and the system has been generally effective and successful. It is the absolute minimum of control now necessary and is serving a useful and essential military purpose.

Q. Is the military cooperating in trying to prevent saturation of civil airports with military activities?

A. Yes—to the highest degree. Both the Air Force, the Navy and the Civilian Components Policy Board of the Office of the Secretary of Defense are represented on the high-level Airport Use Panel of the Air Coordinating Committee, which has been working on problems of joint military and civil use of airports for over a year.

Q. What steps are being taken to familiarize pilots

Charles F. Horne took the oath of office as Administrator of Civil Aeronautics on May 18, 1951. A graduate of the United States Naval Academy, he has devoted most of his military and civil life to programs connected with communications, electronics and aviation. In 1948, while serving as Deputy Chief of Naval Communications as a Captain, he was requested by CAA to administer the program of modernizing the Federal Airways System. He has been vice chairman of the Radio Technical Commission for Aeronautics, chairman of the Air Coordinating Committee's Subcommittee on Aeronautical Communications and Electronic Aids; and chairman of its Air Traffic Control and Navigational Aids Panel. He served as Commanding Officer of the destroyer USS Long and was aboard the battleship Maryland at Pearl Harbor on December 7. He was on Admiral Halsey's staff as South Pacific Area Communications officer and was Radar Communications Officer under Admiral Turner. He was awarded two combat Legion of Merit citations. He is an active member of a flying club near his home

Charles F. Horne

with the change-over from statute to nautical miles in instruments and navigation and what are your major problems in this connection?

A. As a preliminary to a program of pilot education on the change-over from statute to nautical miles, we have had the interested government agencies working out the many details of this change-over. Civil Air Regulations, aeronautical charts, air markers, control tower phraseology, and a multitude of other items must be settled by coordination between operators, pilots, and the affected government agencies. We hope to be able to make the change-over relatively simple from the pilot's standpoint, possibly involving little more than slipping a new face in the airspeed indicator. The target date for the change-over is July 1, 1952. We are planning for about six months of widespread pilot education before that date. An important part of that education program can be the cooperation of publications such as FLYING, in the form of articles. I am convinced that the change is necessary in the overall national interest.

Q. Is there an uptrend in the use of personal aircraft as was predicted at the end of the war?

A. CAA figures show that purely pleasure flying is down. Approximately 80 per cent of the active non-carrier civil aircraft of the country are engaged primarily in useful activities while only 20 per cent are being used entirely for pleasure, sport and allied flying. Production of personal planes in 1950 totaled 3,428 planes, approximately 1,300 less than were retired from service during the year. This does not indicate an uptrend as a result of the interest in flying which was apparent just after the war. The general fact is that the airplane is going into new operations, especially that of agricultural flying, general farm and ranch flying and the transportation of personnel of large business companies. The figures are: agriculture, by farmers, ranchers, *et al*, 7,481 planes; commercial operators doing dusting, seeding, fertilizing, 4,234 planes; industrial users, including aerial photography, power and pipeline patrol and advertising, 1,587 planes; instruction, 11,919 planes; business, 18,244 planes; pleasure and sport, 10,801 planes.

Q. With the increase in our military forces, has the CAA been able to retain qualified tower operators and dispatchers? In the event of a national emergency, what would be the civil airway personnel problem?

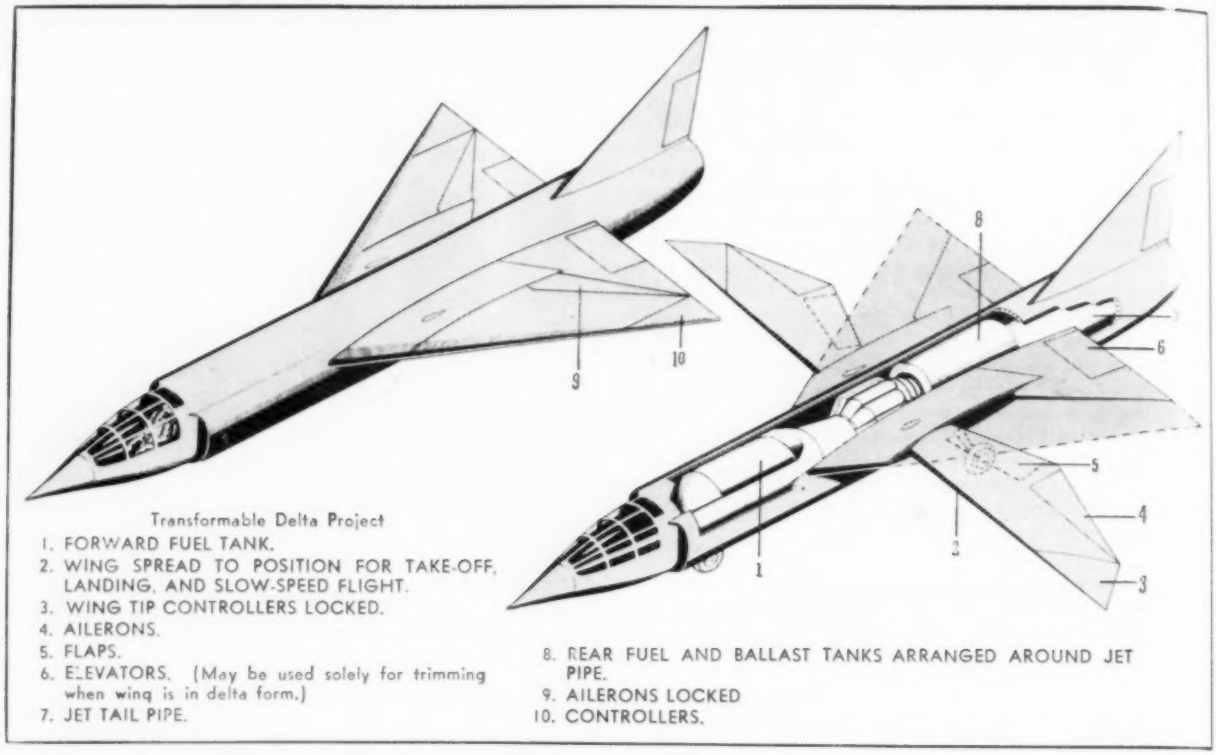
A. Such a high percentage of CAA traffic controllers are members of the armed forces reserves that the problem is serious. So far, we have managed to maintain an acceptable quality in control towers and centers, but the average experience level has been much reduced. In case of full mobilization, the situation would be critical. The military forces have cooperated in individual cases, but no blanket policy has been established. The armed forces have a very real need for experienced controllers, and the situation is complicated by the fact that many reservists want to go on military duty and do not want deferments. To meet this situation we are training additional controllers as rapidly as possible, and also training our communicators in traffic control work, and *vice versa*, so that an individual can be used in either capacity as needed. The Air Force and Navy now realize the importance of keeping the CAA operating efficiently both in peace and war.

Q. We note that the CAA has been backing off the date for airmen identification cards. Why do you do this? What is the purpose of the card? Do you feel that this is necessary?

A. The deadline for the cards was extended twice, partly because delay in passage of appropriations restricted travel of CAA agents who are issuing the certificates and partly because the CAA is trying to help pilots, and not make things more difficult for them. The cards are being issued to permit the maximum possible civil flying under any future condition of national emergency. The cards are necessary for identification purposes in case of full mobilization.

Q. Would the installation of new "swivel" type landing gear on planes make it possible to lay out runways at airports in such a way as to eliminate planes flying over residential areas?

A. Policy of the CAA, announced in 1949, is that it will participate with federal funds in the construction of single runways only on Class I (*Continued on page 57*)



Transformable Delta Project

1. FORWARD FUEL TANK.
2. WING SPREAD TO POSITION FOR TAKE-OFF, LANDING, AND SLOW-SPEED FLIGHT.
3. WING TIP CONTROLLERS LOCKED.
4. AILERONS.
5. FLAPS.
6. ELEVATORS. (May be used solely for trimming when wing is in delta form.)
7. JET TAIL PIPE.
8. REAR FUEL AND BALLAST TANKS ARRANGED AROUND JET PIPE.
9. AILERONS LOCKED
10. CONTROLLERS.

Hydra-headed Delta

Engineer feels wing changeover in flight might overcome few disadvantages of Delta design.

THE DELTA is the shape of the future. This triangular configuration is under exhaustive development in the U.S., England, and the USSR; but right at the moment the British appear to be substantially in the lead. They have four research Deltas flying—the Gloster GA-5, the BP-111, the Avro 707, and Fairey FD1. In addition, they have in the works at least two radical Delta bomber designs. It is not surprising, then, that another of the most significant Delta developments should originate in Britain —a design for a transformable type that changes its shape in flight.

This configuration, which takes its form from the Greek letter △, is in many ways an ideal supersonic shape from the standpoint of both aerodynamics and structure. A Delta wing generally forms an equilateral triangle, or nearly so. Thus, the leading edge possesses an inherent high degree of sweepback. Since this high sweep keeps the leading edge within, or downstream of, the Mach cone, a comparatively rounder, thicker airfoil section can be used in these configurations. The low aspect ratio results in less drag, and high lift coefficient is preserved at higher Mach numbers.

Structurally, the Delta form provides greater strength and rigidity because the length-depth ratio of the spar structure is increased. The increased thickness of the airfoil section offers more space for fuel and armament. Such a wing is also easier to fabricate and maintain.

Deltas have heretofore had two characteristic disadvantages. Since the control surfaces could be installed only at the trailing edge, elevators and ailerons at this position produced extremely low moments. To provide adequate moment arms, the surfaces had to be larger than normal. This posed a number of other problems. Secondly, even highly modified Delta configurations such as the F4D *Skyray* fighter and craft of the "tailless" class such as the F7U *Cutlass* take off and land in extremely nose-high attitudes. The pilot loses visibility at just the time he needs it most. There are still other complications.

A significant new changeable-wing scheme developed by Prof. G. T. R. Hill of University College, London, promises to overcome some disadvantages. In addition—and perhaps even more important—the transformable design appears to provide supersonic aircraft with surprisingly low stalling-landing speeds.

Dr. Hill's design carries a couple of steps further than the variable-sweep scheme used on the Messerschmitt P-1101 and, more recently, the Bell X-5. The new method utilizes a longitudinally-hinged main wing and a stationary auxiliary structure. For high speeds, the main wing retracts rearward and locks against the auxiliary plane to form a single, smooth Delta surface. For take-off and landing, the main wing unlocks and swings forward to the straight-out position normal to an unswept wing. The auxiliary wing then serves as a tailplane.

In the straight-wing configuration, the plane is controlled conventionally by ailer- (*Continued on page* 61)

Give America's Youth Aviation Education

Mr. Latham, Congressman from the 3rd District of New York introduced a bill to the House on April 2, 1951, whereby the CAA would be authorized to aid and cooperate with state educational and aviation agencies in establishing an aviation education program in all public schools.

The record shows that our growing air forces are training the larger part of their pilot personnel from scratch. Having no reservoir of air conscious men, it will take a long, arduous road to man the planes which will be our first line of defense in an emergency.

The Russians, on the other hand, are busy training their youth in all phases of aviation. In a showdown of strength, they may possibly be able to fill as large an air force as they can a ground force. Their answer to the urgency of the cold war has been youth training—a program we have neither understood nor recognized for its values.

If war comes, the United States must have a big, well-trained and hard hitting air force. Anything short of that is an invitation to national suicide.—THE EDITORS.

By CONGRESSMAN HENRY J. LATHAM

YOUTH training in aviation is one of the crucial problems which America faces today. Lack of an adequate training program can endanger the country's safety in time of national emergency; it can lose us our position of world leadership in time of peace.

In only 40 years, the airplane has revolutionized our way of life, and that of all the civilized countries in the world. Recognizing this fact, Russia is already rearing an air-minded generation, grounded in the fundamentals of aviation since earliest years. But in America, no comparable training program for this country's youth has even been conceived.

In order to keep our air supremacy, youth training must be made an integral part of the public school system. It is not enough to train pilots, navigators, mechanics and others in specialist schools after graduation. The entire younger generation should be given a background in aviation and should be taught basic aeronautical skills.

The major reason why this is not being done today is lack of money. A few farsighted aviation officials, educators, federal and state authorities have long realized the importance of youth training in aviation. For years they have recommended the inclusion of aviation studies—not just in vocational and military schools and colleges—but as a basic part of the public school curriculum from primary grades through high school.

Federal aid to schools undertaking such courses is, after repeated attempts to appropriate funds, still non-existent. Furthermore, even within the defense program, moneys for aviation training have been cut to the bone. The postwar G.I. Aviation Training Program has been completely abandoned. Air Force Cadet Training is budgeted to the last wing insignia, and its scope is necessarily limited to a small, special-age group.

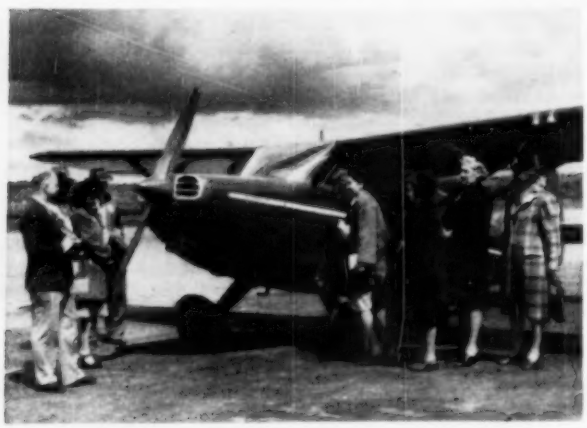
Many public schools have become air-minded and are doing their utmost to provide fundamental aviation studies. But without adequate funds, neither the schools nor the military establishment can do the broad-gauge job required to produce an air-wise American youth.

The other stumbling block in aviation education is the lack of a coordinated and centralized program. A great effort is being made to remedy this, but lack of funds and lack of clearly defined objectives make it a difficult task indeed. The Aviation Education Division of the CAA and the Civil Air Patrol have done much toward setting up curricula for the public schools. But their function is a

Various communities plan tours to airports and aircraft facilities so that elementary school children can watch the air age at work.

purely advisory one. The success of their recommendations is precariously dependent on the interest, initiative and financial resources of the individual community.

The reasons why we need youth training in aviation are so many and so compelling, that these stumbling blocks must be overcome. In the last war, America learned the hard way that thousands of young pilots and airmen had to be trained in record time. While public schools could not—in the foreseeable future—provide fully trained air personnel, they could produce young men and women with fundamental training behind them—ready to go in time of crisis and be useful citizens in air defense.



Teachers are familiarized with make-up of a lightplane prior to bringing the students for their air age indoctrination tour.

In addition, it is a matter of fact that aviation's peacetime job is a constantly expanding one. The use of aircraft has brought 500 new job types into being. Hundreds more are found in fields relating to aviation. At present, the airlines employ half a million people, while aircraft manufacturers and related industries are heading for an employment of a million.

Education for work in this rapidly growing field is a responsibility which our public schools cannot, and must not, ignore. Pilots, crewmen and technicians are but three classifications which must be filled with ever-increasing numbers of young men. Needed also are aeronautical engineers, aeronautical administrators, electronics specialists, those concerned with aviation law and medicine and a host of other experts. Even those who will not work directly in aviation jobs must have a working knowledge of the subject in order to take advantage of the changes wrought by aviation in nearly every modern business.

In technical high schools where such courses are already in operation, students can prepare for either civilian or military jobs in aviation—knowing that they will need little or no additional training. Already a number of these trade schools hold CAA Air Agency Certificates authorizing them to train aircraft and aircraft engine mechanics. Several have added flight instruction to the curriculum. Even in some non-specialized high schools, courses in aeronautics are being supplemented by field work in the control tower, the map and weather rooms, and the engine repair shop of local airports. In addition to theoretical book instruction, students thus gain practical experience in servicing airplanes, in map reading, navigation, meteorology and the hundreds of jobs neces-

Schools, such as Embry Riddle, have made great strides in training youth for the air age but a Federal-aided school program is needed.

sary to keep an aircraft flying. But these excellent attempts are still the exception rather than the rule. The goal should be at least optional courses of this type throughout the entire public school system.

Even this, however, is not enough. Aviation, properly taught, must cover a much larger field than that of military or vocational training. Aviation must be considered as a force whose impact is felt in every area of human enterprise. Because it affects the daily lives of everyone in America and in most parts of the world, its social and educational implications cannot be neglected if young Americans are to achieve an integrated understanding of the world in which they live.

This is the basic attitude which should guide aviation studies in the lower grades. In a world revolutionized by air transport and travel, this subject must be woven into the fabric of the school curriculum—into history, civics, science, politics, literature and cultural studies. Without such integration, the subjects studied are neither realistic nor meaningful in the modern world.

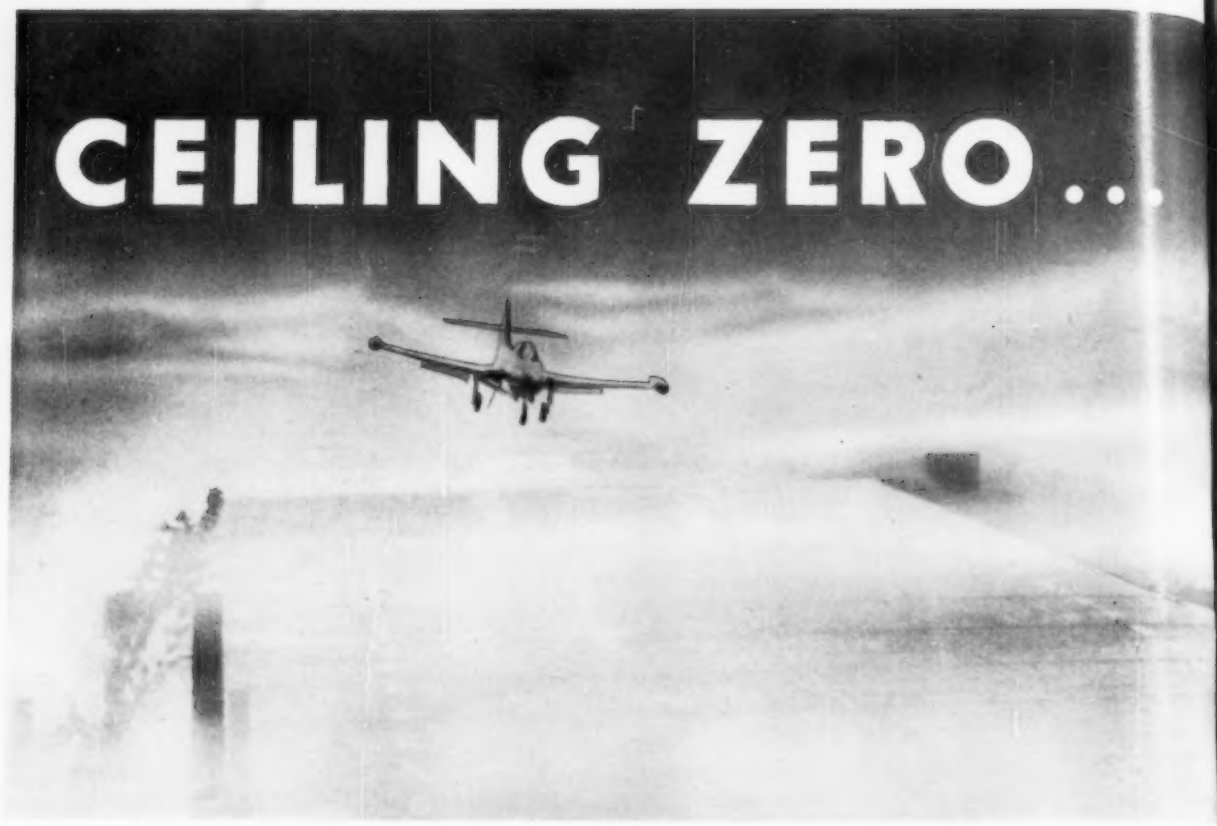
As defined by CAA's Dr. H. E. Mehrens, aviation education must therefore be "both special and general; producer and consumer; military and civil. It must acknowledge the influence of aircraft upon social institutions and upon the general concerns of nations. It must be a comprehensive program based on an understanding of the complexity of the subject involved."

Perhaps the greatest asset in teaching aviation is this: It is a subject in which young people, from small children through young adults, are vitally interested. Aviation subject matter has already been used to teach the basic tools of language and mathematics—with excellent results. It has now been demonstrated that these abstract skills can be most effectively acquired if learned through subjects which the child thoroughly enjoys.

Experiments by the CAA with second grade children show how this technique quickens response to all school work. Field trips to the airport were followed by thank-you letters which taught spelling, sentence structure, handwriting and letter form. Arithmetic was learned more easily when the children designed and built their own model airplane and airport—involving a knowledge of numbers, linear, and three-dimensional measurements and calculations. By "playing" ticket office, they learned to use scales in weighing bag- (*Continued on page* 54)

Some industrial high schools offer courses in aviation trades but few of the general schools have the funds or facilities.

CEILING ZERO...



Carriers will now operate their aircraft in foul weather or fair by using a new and uncanny FM radar system coupled with a new landing technique similar to GCA.

EVERY man 'jack aboard the fog-shrouded flattop off Cape Cod sensed that history—or disaster—was in the making. Far aft on the port side "walkaway," just below the Landing Signal Officer's bridge, the skipper and his staff crowded around a large black box called a "console." Occasionally they peered into the grey mist that swirled in close around the flight deck. Aiming for that deck from somewhere out there was a pilot in a *Bearcat*.

One man never looked up. This officer was the Approach Controller. He watched intently two radar scopes in the console, where greenish light traced the path of the fighter in the fog. He chanted radio instructions to the pilot, who had only his flight instruments and FM radar altimeter to fly by.

When the scopes showed the *Bearcat* fighter to be two miles astern, the Approach Controller shifted his gaze to a vertical row of lights on the right side of the console. A white light glowed. The officer chanted, "Speed correct. You are Roger."

Suddenly the light went out. A green one lit up. The AC warned, "Reduce speed." Out there in the fog the *Bearcat* pilot shallowed his glide just a trifle. The white light came on again. Then the controller advised, "Steer two degrees right." A moment later: "Steady—. You have half a mile to go."

The Landing Signal Officer strained to see into the gloom. His luminous suit and signal paddles glowed strangely against the foggy background. Then he saw the fighter loom suddenly out of the mist. The right wing appeared low. He gestured emphatically with the paddle in his left hand, hoping that the pilot would see it in time to level up. He did; and the LSO held the paddles straight out in the "Roger" signal for just a moment. Then his right paddle described a sharp chopping motion across his body—the "cut" signal.

The *Bearcat* pilot cut his throttle and, a moment later, plunked the fighter onto the deck in an almost-perfect landing.

This was the first blind landing to be made on a flattop under actual instrument conditions. Moreover, this test —the latest of a long series which were less successful— brought to a rewarding conclusion one of the most significant developments in naval aviation and electronics since World War II.

CCA, as this technique for Carrier Controlled Approach is called, will soon mean to Navy airmen what the now-universal GCA means to airliners and other planes approaching weathered-in airports. The spectacular development was made possible largely through the use of a new FM radar system.

Now, to their great strategic and tactical value—proved again and again off Korea to convince those who had

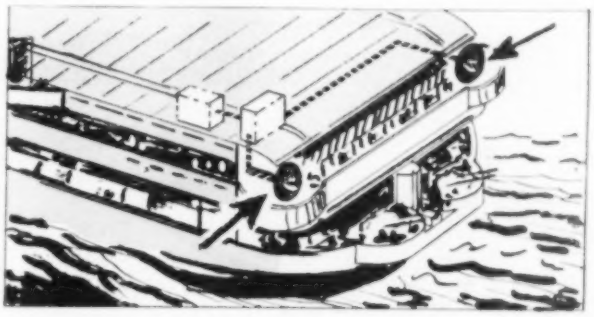
lost faith in the flattop—the carriers will soon add this ability to operate their planes in foul weather or darkness.

By the time CCA goes into fleet service, a new attachment will make this gear still more effective. FM radar works so well at close quarters that the pilot will soon be *talked all the way down* onto the deck in darkness or fog too thick for him to even see the Landing Signal Officer. This is a device that "senses" the rise and fall of a pitching carrier's deck. It will indicate automatically just the right moment for the pilot to cut his throttle, in order that the deck will not settle out from under him, or, worse still, heave suddenly to smack his nearly-stalled airplane.

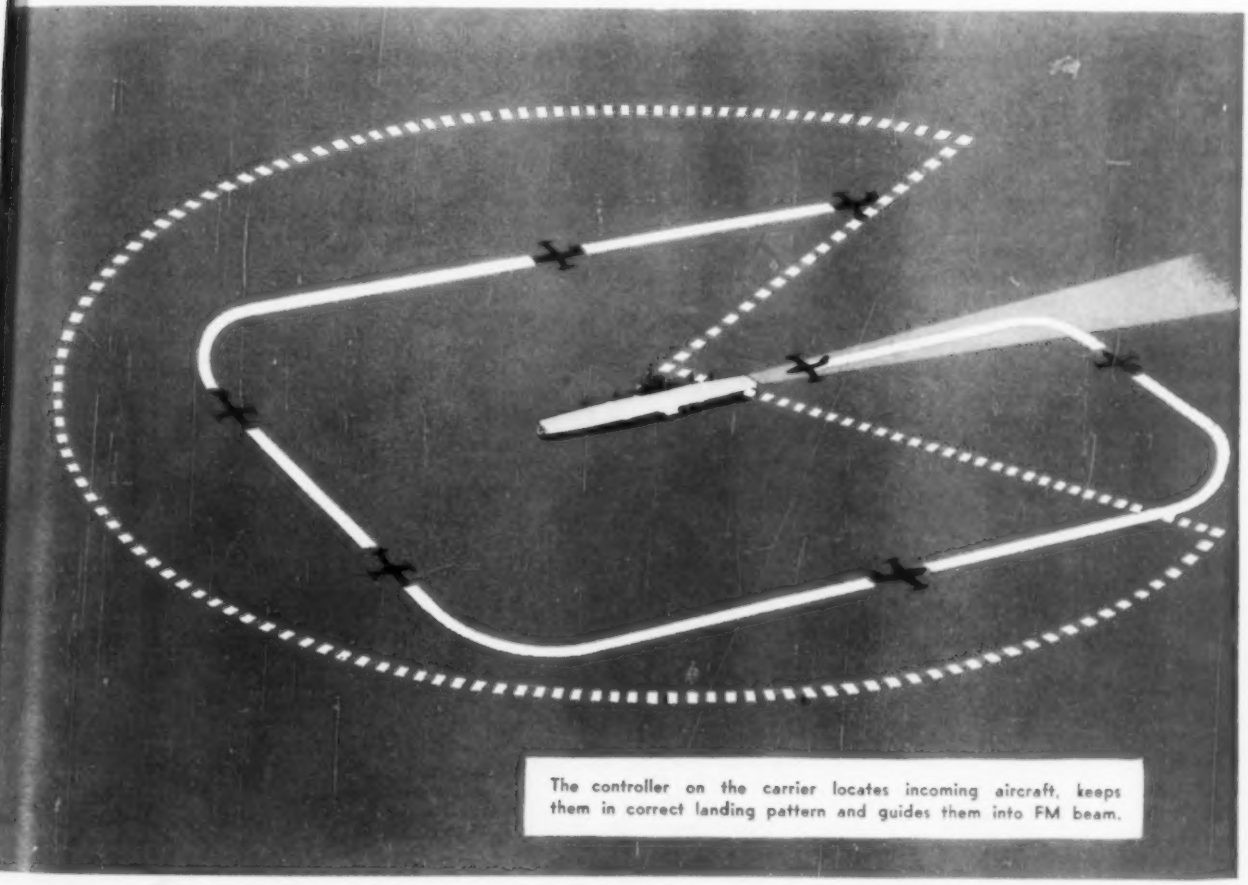
To appreciate the CCA system, let's consider briefly the functions of the popular GCA (Ground Controlled Approach) technique. The latter procedure is ticklish enough when the pilot has a stationary runway on which to set down. With GCA, the controller has to know three factors: the plane's distance from the airport, its height, and its direction from the runway. The carrier approach controller must know, in addition to these, two other factors. The first is the relative speed of the landing airplane and the moving carrier. Or, put another way, the closing speed of the plane towards the flattop. The second additional factor which the AC must consider is the velocity of the wind over the carrier's deck. This, of course, influences the closing speed. To simplify computing procedure, the ship's speed and the wind velocity were combined and given the odd term "carrier airspeed."

As in the case of GCA operation, air search radars are used to sweep the sky surrounding the flattop and determine the approaching plane's distance, its altitude, and its direction from the after end of the flight deck. For this surveillance the CCA system employs two SPN model radars of the pulsed type, with parabolic antennas mounted on the radar mast above the island superstructure. But the final approach is monitored, in addition, by the little-known, hush-hush FM radar technique. For this installation two smaller dish antennas are mounted on the stern of flattop just below the flight deck. This FM gear, together with its computor unit, hold the key to the all-important "carrier airspeed" factor.

Here's why: Most FLYING readers are generally familiar with the way in which the popular pulsed radar spits out towards its target periodic bursts of electrical energy. FM radar, on the other (*Continued on page 42*)



Final approach to a blacked out deck is partially controlled by two small dish-type antenna mounted at the stern just below flight deck.



The controller on the carrier locates incoming aircraft, keeps them in correct landing pattern and guides them into FM beam.

STRANGE FIELD TAKE-OFF

By WESLEY NEAL

BENNY ADAMS was a smooth fly-boy with 1,500 hours of flawless time. One day, Benny developed magneto trouble and set his *Cub* down in a freshly-plowed field. It was a well-executed forced landing and Benny felt proud that everything came off right.

In Hoyle style, Benny summoned a mechanic from the nearest town to fix the magneto. Ben ran up the engine and checked her out until she purred sweet. Then it happened. He proceeded to fly off the ground only to three-point into a clump of trees at the end of the field.

What happened to Ben is not uncommon. An Air Force Colonel did the same thing with a B-29. Only he had 10,000 feet of concrete runway beneath him and the trees were a wire fence. Two high-but-not-high-enough young executives ended a business-and-pleasure week-end in Baltimore staring disconsolately from the smashed cabin of their side-by-side when their sour take-off brought them uncomfortably close to Chesapeake Bay.

Today, there are more than 6,000 CAA airfields in the United States. When we add each spot where an airplane might possibly land and take-off, this figure assumes astronomical proportions. Obviously, we cannot know every peculiarity of terrain and wind or hazards to flying connected with all these sites. Equally, but unfortunately true, there seems to exist a widespread tendency to ignore these peculiarities. It is this tendency which brings headaches to the CAA, high costs and broken limbs to the private pilot. Such was the case with Benny Adams, the Colonel and the two reckless rakes.

So far this tale of woe sounds like, "Let's stay close to home and leave the x-c for George." Merely a matter of recognizing the malady. Now how about the cure?

First, we must realize that a strange field is not necessarily a sandy river bottom or a cropped-close landing strip on Uncle Bert's forty. Idlewild or Los Angeles International can be a strange field—if you are using one of these for the first time.

I know of a first-class American pilot who ran out of runway on a major Ecuadorian airport because he forgot to reckon with the high altitude. A crack military flyer in Italy took a sneak hop in an L-5 to make a "diplomatic" call on a black-eyed beauty. Trouble was, this lad let international relations crowd out his good sense and he

Weight, stalling speed, runway length and weather must be figured for safe take-off from a new airport.

failed to allow for a muddy field on take-off. At last report, the remains of the L-5, after our friend extricated himself, were piled up against a Roman fence post. All of which goes to show that there are a few basic factors to consider in connection with strange field take-offs. Equipped with the following information, strange fields need offer no cause for distress, much less accident.

Primary step in working out a strange field take-off procedure for your particular airplane is a series of tests, both on the ground and in the air. Weight is the first item on the agenda. This figure may be obtained from your distributor or manufacturer. Let's take a typical example—the Piper P-18 with a Lycoming engine installation.

Assuming normal fuel and oil load, 400 lbs. pilot and passenger weight and 50 lbs. of baggage, maximum take-off weight for this plane is 1,500 lbs. Allow for additional equipment such as radio and extra fuel tanks. It might be well to check plane's gross on official scales.

Certain of his airplane's maximum gross weight, the pilot now determines stalling speed under take-off conditions of power and trim. Before you do this, though, let's analyze some of the forces involved in a stall.

We recall that stalling speeds are read from the airspeed indicator, which is dependent upon the pitot tube in which are two pressure sources: dynamic and static air.

At a specified altitude, there is a given number of molecules of air per unit volume. The static line in the pitot head measures the number of molecules to be found in *still* air for any given height above the sea. And the dynamic line indicates the number of molecules which strike the pitot head as the aircraft moves through the air. It follows that the ratio between the number of molecules in still air and the number striking the dynamic line establishes the air speed.

We remember, too, that the same molecules of air which give a speed indication provide lift. And at a given altitude, the number of molecules which give an indication of speed is the same as the number which provide lift. If this relationship were charted on a graph, we would see that there is a constant proportion between air speed and lift—regardless of altitude. Simply stated, this means that if the airplane stalls at 1,000 feet at an indicated air speed of 60 m.p.h., it will likewise stall at 10,000 feet at the same indicated air speed. An understanding of this fact is essential to any successful strange field take-off.

Now we are ready to deter- (*Continued on page* 40)

BAILING WIRE LANDING SYSTEM

Pilots called it the "Crystal Ball," but this granddaddy of GCA actually worked and took some terror out of flying the Aleutian fog.

By J. W. HUTTIG

LOOKING back on it now, it seems that the impossible was accomplished. But official records and photographs are mute evidence that even the impossible can be accomplished if it's needed badly enough.

Back in the States they were getting ready to celebrate the 4th of July. Independence Day in 1943 was just another patrol day for the Air Force and Navy pilots flying over the Aleutian Islands—they had their own brand of fireworks, fog and mountains almost every day of the year.

The Controller's Log would show that Capt. William B. Pope was in charge of the Fighter Operations Center that day. What it will not show is the feeling of despair that fell over the entire operations room when Cedar Red Five's first "May Day" call was received. Cedar Red Five was a P-40 fighter from the local air base. On the operations board his departure was listed as Amchitca and his destination as Adak. His report of "position unknown—eight minutes gas" left little doubt that his landing time would never be posted.

Captain Pope's first action was to alert the radio homing station, a VHF Direction Finder located on top of one of Adak's numerous hills. Requesting the pilot to count to ten, Pope was able to get a "vector" and tell the pilot his course to the base. The pilot's location couldn't be determined as his P-40 was out of range of the other Direction Finding stations in our network. In the minutes that swiftly followed the pilot's voice became increasingly stronger in Pope's head phones. Then, just 7 minutes after his first call for help, Cedar Red Five's last radio transmission was duly recorded in the Controller's log. The Bering Sea had claimed one more victim.

This was not an unusual occurrence. Patrols had to be flown and the wedding of Japanese Current and Bering Sea creates a perpetual mist that hangs over the islands like a shroud. Here was just another scene in the nightmare of listening and waiting—we were helpless to do anything but play out our role on this macaber stage.

That night in our quonset hut, the plight of Cedar Red Five was the primary subject of conversation. Lieutenant McClure, Communications Officer of the 11th Fighter Control Squadron, was there too—to help us consume our mixture of Aleutian Punch. This informal critique lasted well into the morning hours. We discussed our system of controlling interceptions, the limiting effect that the mountains had on our radar and D/F (Direction Finding) stations, and the important problem of bringing our fighters down through the fog. We talked about what we had done—what we should have done—how we would handle future Cedar Red Fives.

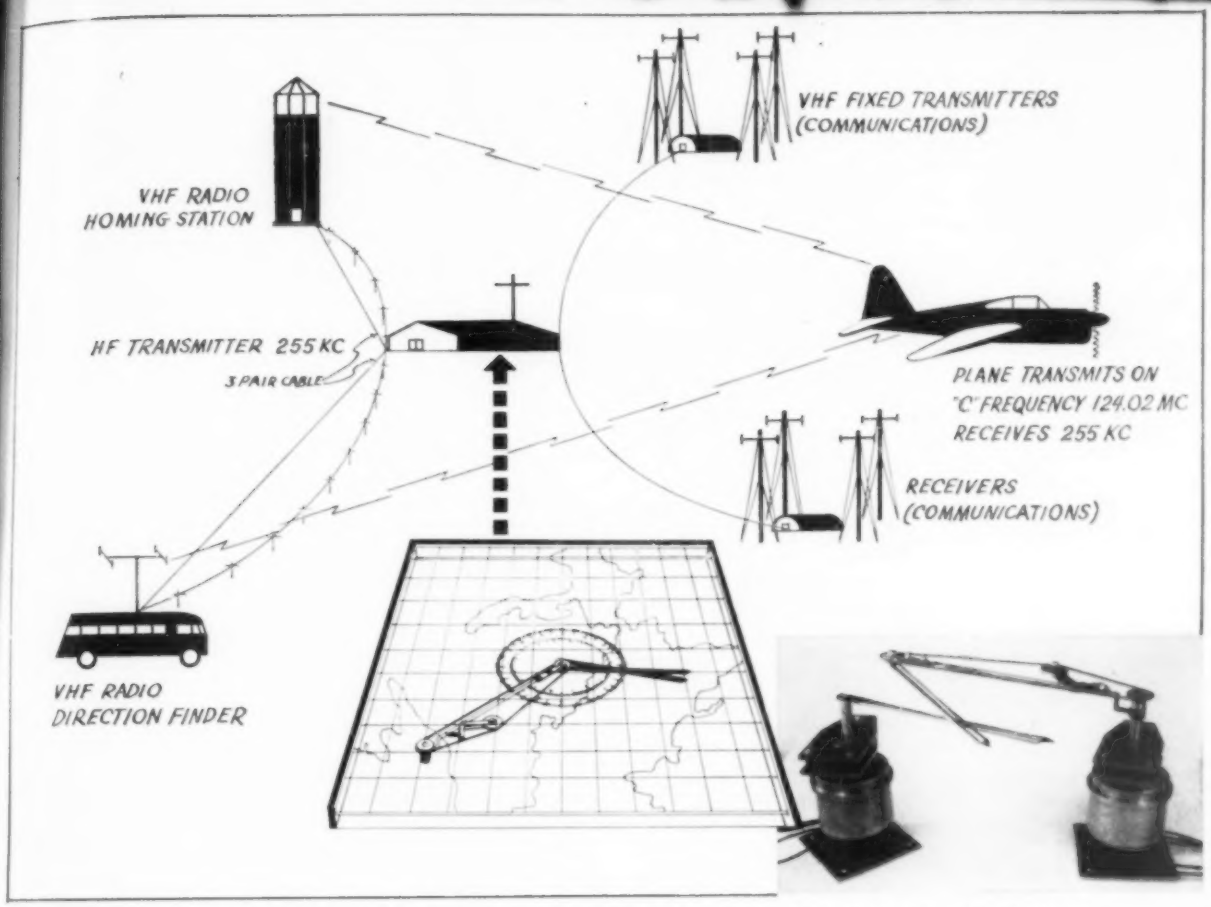
Lieut. McClure was the first to put out a constructive thought. "What we need," he said, "is some way of speeding up our 'fixes'—telephoning in azimuths from the D/F stations and plotting positions by hand isn't fast enough. It should be done automatically."

"Hell," said Pope, "that's easy. All we have to do is run lines from the D/F's to the Operations Center. We can put a selsyn motor on the D/F antenna, put another one under a pointer at Operations, and get an instant report of the plane's bearing from our station. We can rig up a scale map under two of these pointers, the Direction Finders can follow the plane and we'll have our automatic fix. It shouldn't be too hard to make the plane send out a continuous radio signal that the D/F's can track."

My contribution to the problem followed their thoughts. "If you can do that, why not go whole hog and bring the planes right on down to the end of the runway. All we'll have to do is tell the pilots their headings and the altitude to fly."

That's how the idea was born. No one of us could take credit for the entire idea. In fact it wasn't even new. Later on we discovered that a man in Sweden had worked out a similar idea on paper and obtained a patent in 1937. But this wasn't a paper program—it had to work.

The idea was a simple one. With two selsyn motors we could make pointers turn in the Ops room every time the Direction Finder's antenna were rotated. We would mount the two pointers under a transparent map and synchronize them with the two D/F antennas. While the plane sent out a continuous radio signal, the D/F stations would point their antennas and the pointers would cross over the map in the Operations Room and give us a position "fix." Knowing the plane's position at all times it shouldn't be hard to talk him down a predetermined flight path. We called it the X-Plan because the pointers formed



Arrangement of the X-Ray blind landing components improvised by the men up in the Fighter Operations Center at Adak during the early days of the war. The inset shows the synchronized pointers which were the heart of the system.

an X and there were a great many unknown factors involved.

Our basic equipment was already there. The center of our X-Plan was a standard Aircraft Homing Station. Like all our other equipment it was a hand-me-down from the more critical theaters of war. Built in the form of a tall silo to fool German bombardiers in England, it stood out like a sore thumb on Adak where the nearest cow was 1200 miles away. Two other Direction Finding stations would form the basis for our triangulation problem.

Running the wires to the stations wasn't as easy as Captain Pope had thought. Even procuring the necessary wire was difficult—it had to be spirited away from the Army Engineers. Then we had to lay the wires over the tundra. There were no poles available and no trees within hundreds of miles. That's where we learned to hate the Caterpillar Tractors. The Engineers and the Sea Bees took turns running over the wires and causing communication failure at the most inappropriate times. Luckily it never happened when we were doing an emergency talk down.

Surprisingly, the selsyn motors were the easiest to obtain. They came along with a large piece of scarce plexiglass in a trade for a quart of *Tom Burns*. *Tom Burns*, "a rare blend of *imitation* Scotch-type whiskies," had replaced money as the legal tender of the island. I only hope that the Chief Petty Officer who made the trade was as thrilled with his whisky as we were with the selsyn motors.

For want of a better name we called our automatic position indicator "the box." When it was finished the pilots of the 11th Fighter Squadron were very cooperative in flying practice missions with the X-Plan. Sometimes their confidence was a cause for real concern. After one practice mission we found that a youngster had been flying his P-40 through our mountain-walled bay at a 50-foot altitude on instruments. We didn't know about the heavy fog that had moved in from the ocean—the pilot didn't think it important.

The first landing made with the X-Plan was the one that caused the most gray hairs. With an official weather report of a 50-foot ceiling and ¼-mile visibility, a B-34 bomber called for help. The bomber was routed from Anchorage and "lost" with a reported 15-minute gas supply. We had no authority to use the X-Plan but this was an emergency. With Captain Pope talking him down, the B-34 roared in over the end of the runway at excessive speed. As he turned to land on a longer bisecting runway, his "gas empty" lights blinked on. Fearing that he couldn't reach the second runway, the pilot changed back to his original course, pulled up his landing gear, and bellied safely in on the first runway.

The first report flashed from the field tower was "crash on runway B." We had visions of not only tragedy but of court martial as well. However, when the investigating board finished its findings we were absolved of all blame. Although there was no commendation, and I certainly felt that Captain Pope deserved one, the X-Plan gained immediate support from the pilots. When higher headquarters ordered us to abandon our (*Continued on page* 48)

ALARM-CLOCK NAVIGATION

Here's how to make your own time-speed-distance computer with an alarm clock and a few tools.

By ALICE S. FUCHS

(Who told how to make a drift meter from a cheese-box in the September issue.)

THE WORLD'S most reliable navigation instrument? It was invented probably by the Chinese about 2,000 years ago. In its modern form it is absolutely indispensable to cross-country pilots—no gyros to spill, guaranteed to work just as well upside down as rightside up, in rough air and smooth, yet comparatively inexpensive.

We're talking about the clock. Since the earliest days of aerial navigation pilots have recognized its value in computing ground speed and estimating ETA's, but usually the clock has been teamed up with some sort of a time-speed-distance computer. Few pilots have realized that the clock itself can be made into an automatic mechanical computer eliminating the need for any other mechanism.

By the substitution of a specially constructed diagram for the dial of the clock, any round-faced clock can be transformed into an ingenious computer that requires only a fraction of the work needed by any other computer. Automatically, with no effort on the pilot's part, the clock hands move around pointing to ground speed, number of miles flown, and ETA's for destination and check points.

For conversion to an automatic computer any round-faced clock will do, provided the dial is large enough to be easily seen. The accompanying illustration is made to fit the popular Baby Ben alarm clock made by Westclox. This clock was chosen to illustrate the computer simply because it is an inexpensive clock of fairly rugged construction and is easily obtainable everywhere. Any round-faced clock could have been used.

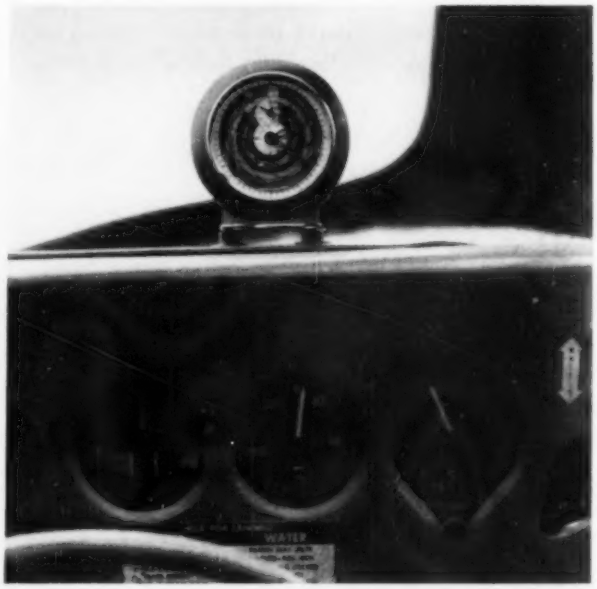
The diagram is the exact size needed and may be cut out directly, or traced and transferred on other paper, to be pasted over the dial of the Baby Ben.

First step in transforming clock into computer is to cut out the diagram and, using a sharp razor or X-acto tool, cut out the center small circle for insertion of the hour and minute hands, the upper left semi-circle to expose half of the alarm diagram, and the tiny semi-circle for the insertion of the little alarm hand. It will help considerably in reading the instrument if the segments marked off by circles around the center are painted different colors with relatively dark and light colors alternating.

Remove the glass and front part of the case by taking out the three screws around the outside edge of the clock. Unless you are adept at clock work, it is best to have a watchmaker remove the three hands (minute, hour and alarm hands). The end of the hour hand should be snipped off so that it reaches only as far as the small inside circle of the new face. Paste the new dial over the clock dial, replace the hands, glass and front, and the instrument is ready for mounting.

If you rent your airplane or fly several different planes, you can bore and tap holes in the bottom bracket of the clock so that rubber suction cups can be screwed into the base. Thus, the instrument can be quickly installed and removed from the plane.

If it is used always in the same airplane a more permanent type of mounting can be arranged. One thing is important in mounting the clock—it must be placed so that you can get your hand *behind* it easily to set it. A position on top of the instrument panel is perhaps the best.



When completed, the new instrument is installed on top of plane's instrument panel by the use of a couple of suction cups.

Operation and use of the automatic clock computer is simple and painless. After taking off on a cross-country, climb to the desired altitude, get squared away on your heading and pick out a convenient check point for your "point of departure." When passing over this point, reach behind the clock and set all hands at zero. (It is assumed that you have previously wound the clock.) From this point on, the automatic computer has started working for you, ticking off vital information with a precision difficult to achieve with any manually operated computer.

For example, we will assume that upon passing over the point of departure you have set the hands at zero. Sometime later you identify beneath you a check point 20 miles from the point of departure. What is your ground speed? Instead of getting out a manual time-speed-distance computer, figuring elapsed time and revolving the dials to the proper setting, just look at your automatic computer clock.

There are two sets of lines. Those which form complete circles around the center are the speed lines showing ground speed, and the curved lines going from the center to the outside of the dial are the distance lines. Note where the large hand intersects the curved 20-mile distance line. If this intersection occurs exactly on one of the large circular speed lines, simply follow that circular line up to the list of numbers at the top of the dial and read your ground speed. If the intersection occurs half way between two of the circular lines the ground speed is half way between those two numbers—95 if half way between the 90 and the 100 lines. You will have to estimate the proportional part of the ten m.p.h. interval.

You can carry this ground speed in your head if you have a good memory. However, here is where the small alarm dial, half of which is exposed in the sample diagram, comes in handy. It is easy to reach behind the instrument and set the little alarm hand at the number corresponding to the ground speed. Set at nine for 90 m.p.h., at ten for 100 m.p.h., etc.

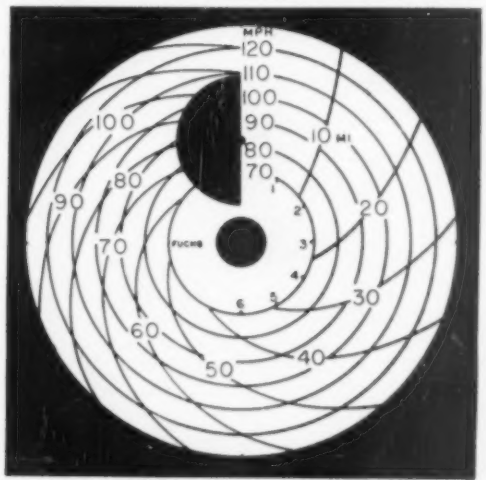
From now on you can sit back and relax, and read your miles-travelled by a mere glance at the clock. Once your ground speed is determined, you can look at the clock at any time, note where the minute hand intersects the circular ground speed line and see which of the curved distance lines this point touches, or how far between two distance lines it touches.

Assume that you have determined your ground speed to be 110 m.p.h. After flying for some time, you look at the clock, follow the 110 m.p.h. circular line around to where it hits the minute hand, and find that this intersection occurs right at the 50-mile curved distance line. You have then traveled 50 miles from your point of departure. If the intersection had occurred half way between the 50 and the 60-mile curved distance lines, you would know you had traveled 55 miles from your point of departure. A little practice will make it easy to read these distances and ground speeds quickly.

Meanwhile, the hour hand is also working for you. When you have flown one hour, the hour hand will point to the little figure 1 on the inside circle and the minute hand will begin a second revolution. While it is unlikely that you will make a mistake of as much as an hour in your timing, always be sure to glance at the hour hand when computing distance. Take the distance as indicated by the minute hand and add to it the hour figure (indicated by the hour hand) multiplied by the ground speed. If the minute hand indicates a distance of 35 miles and the hour hand points a little past the figure two, multiply your ground speed by two and add 35 miles to it, since you have flown a little over two hours.

The automatic computer is of special value to the solo pilot, who sometimes has to perform a sort of juggling act with computer, pencil, log and map while trying to keep the plane straight in rough air. While a log is a valuable supplement to any form of navigation and it is always advisable to keep one, the automatic computer can be used successfully without a log. There are times when rough air or poor visibility require the pilot to spend all his time on pilotage. It may be inconvenient or even inadvisable for him to bury his head in the cockpit for complicated computer and log computations. Yet this is the very time when knowledge of his ground speed and ETA's at check points may be most essential. This knowledge may mean the difference between being "a little lost" and being entirely lost. Here is where the automatic computer, telling ground speed and ETA's at a glance without hand manipulation, is invaluable.

The instrument pilot, likewise (*Continued on page 42*)



First step in making the computer is to cut out the above diagram which is shown in exact size. Next cut out the small black circle for insertion of hour and minute hands. Then cut out semi-circle to expose half of alarm hand. Then remove the glass and front part of the clock case and insert diagram as directed. Your completed instrument should look like this (left).

The Farmer takes a Tour

Here's how the airplane pays off and also does a constructive job.

To get full benefit from a tour, passengers should be briefed before take-off on the flight and told what to look for on the ground.

By CHARLES H. MOZER

THE DAY of the harem-scarem air show is over. Developing in its place is a more dignified educational-type of exhibition that does the dual job of selling aviation to the people and showing these people how to live better, farm better and make a better living. And while it is doing this job, the show is also making a few dollars for its organizers.

This new air show—or tour—had its beginnings a few years ago, but the idea has taken such root that it is spreading all over the country—not yet like wildfire, but fast enough to make many people notice it.

The Air Tour has graduated from showing the need for watershed conservancy districts to the point where it now demonstrates to the urban, as well as rural public, how and why cities are expanding and what is being done to alleviate housing shortage. It is being used to sell large pieces of real estate and to acquaint the public with a project that needs the public's support.

The theme of the air tour—"You can see it face to face" is proving increasingly more effective. For the airplane gives a comprehensive picture. It shows the precise relationship of one farm, or city, to another. The airplane saves time. In 30 minutes, an alert passenger can study the farms that string out along 100 miles of highway. There's little financial risk,—it's pay-as-you-go. And finally, it's democratic, a community activity. Everyone can help.

The state of Ohio was the scene of 46 of these tours in 1950-51 alone—46 tours with 7,000 passengers flying more than 400,000 miles. Not that the community air tour is restricted to Ohio—New York State, New England and others have had several. Some of them have been co-sponsored by Canadian conservation officials.

But Ohio, through its Aviation Board of Columbus, is probably the most active of the states. Beginning in 1946 with a small rural tour under the supervision of Clifford Coffman, a Flying Farmer, Ohio has seen the tours grow in frequency and size to the climactic Akron-Canton Air tour in October of last year, which drew a crowd of 150,000 people.

Local Soil Conservation Services were often the driving force behind the tour because they knew the value of the airplane as an instrument for studying the land, but obviously they couldn't do it alone.

Take, for example, the Delaware District Air Tour held at the airport at Delaware, Ohio, last August. The list of sponsors alone includes the Soil Conservation District, Agricultural Extension Services and the Ohio Aviation Board; plus the Chamber of Commerce, The Kiwanis Club, The Delaware *Gazette* and Delaware Aviation, Inc.

How do these disparate elements combine to produce a smooth-running air tour? First of all, sponsors agree on a theme, a central idea. Something like "Planning For Tomorrow by Seeing Today" or "Your City—Present and Future." Delaware wanted to point out with pride the rich farms that had helped capture their 1951 Goodyear Soil Conservation Award—the sod waterways and improved meadow on Morgan Chamberlain's farm, the improved woodland and farm pond at Arthur Jewell's.

Note that the program had a goal other than boosting aviation. But aviation is still the big winner in any air tour because the public, having once made a successful flight, is "sold." Particularly because the people at last see the plane as a means to an end rather than an end in itself.

Even though it is better for non-aviation groups to promote the tour, aviation personnel play a major part in any tour. For example, Fixed-Base-Operator John R. Florance, Manager of Delaware Aviation, Inc., did most of the legwork for last year's August tour. First, he contacted four airports for planes and pilots. He offered the pilots $2.50 a passenger for each half-hour flight. Since all the planes used were four-place Pipers, Stinsons, and Cessna 170's, each pilot grossed $15.00 per flight hour. Gas and oil were sold at regular rates. And Florance figures that it must have been a good deal since one of the pilots continually pulled out of line in the passenger loading area to grab off more than his share of flights.

At other tours, gas and oil have been supplied by local oil companies. For instance, at the Licking County Tour last year where ten planes carried more than 300 passengers, the Pure Oil Co. paid for all fuel used in both preview and passenger flights.

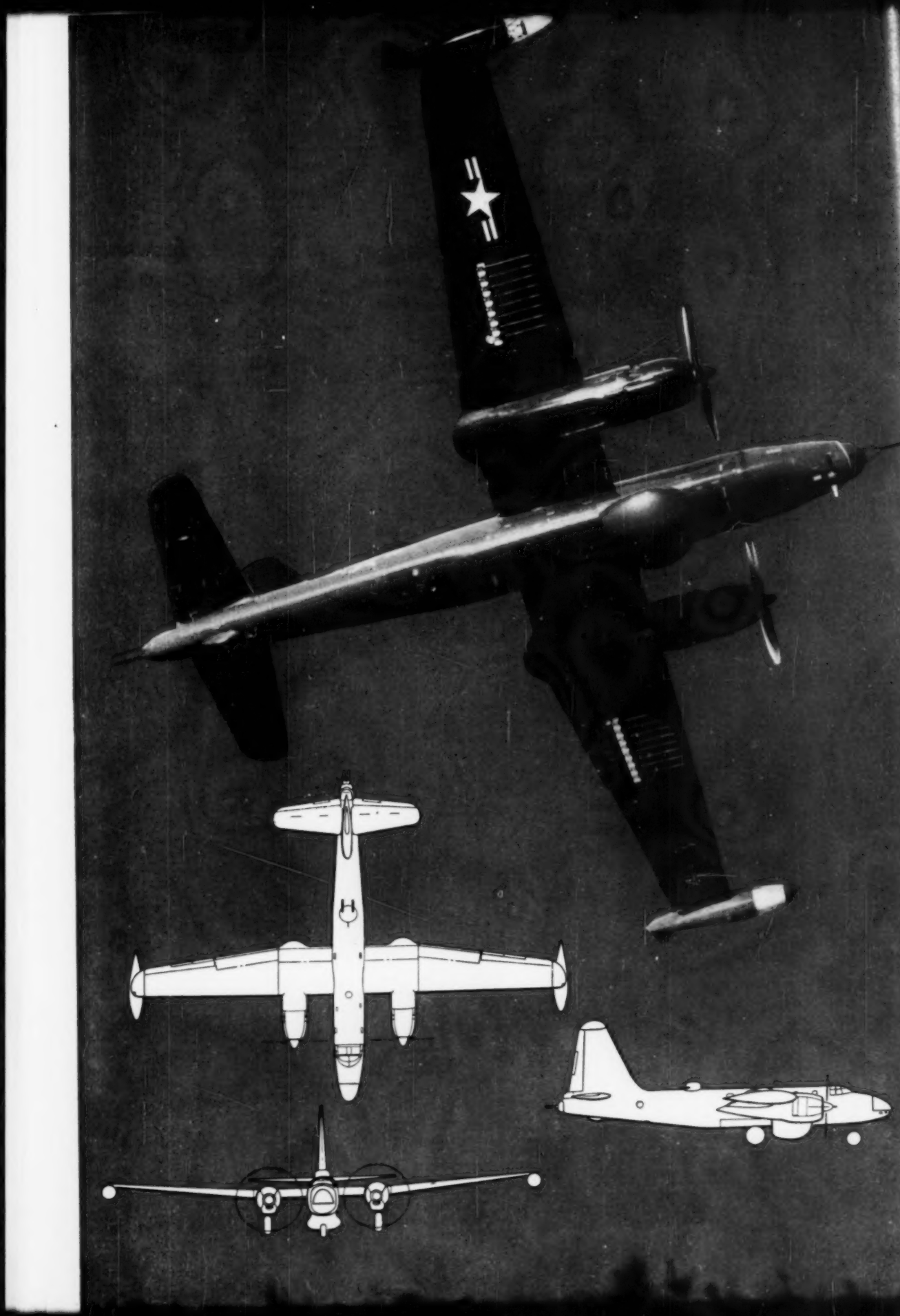
But arranging for aircraft was not Florance's only job. He attended all six committee meetings held in the office of the County Agricultural Extension Agent, and along with Gerald Solt and William Hayes of the local Soil Conservation Service and County Agent Paul Cunningham, he helped lay out the tour route.

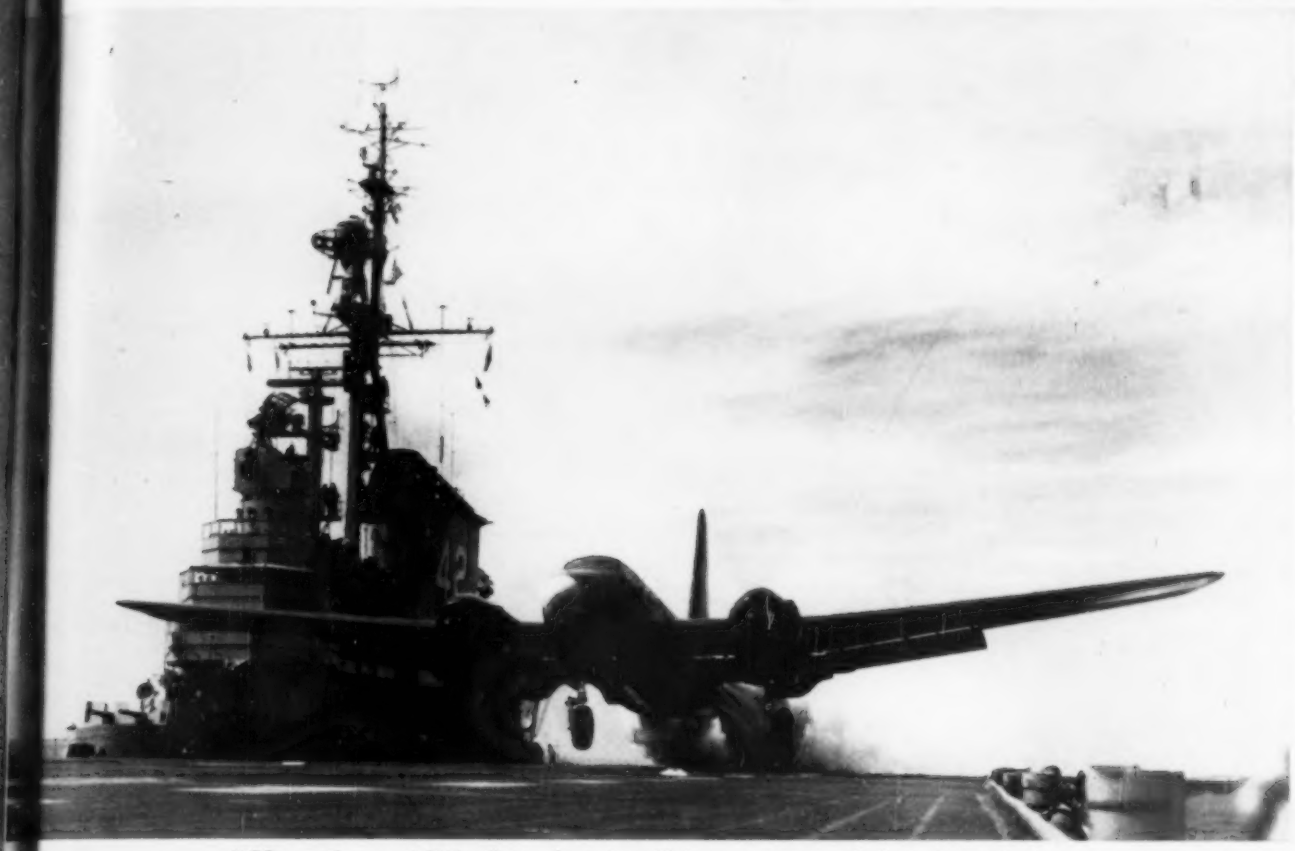
In laying out the route, the main problem always is keeping the route short yet still showing most of the good and bad points of the county. Some sommittees have solved this problem by laying out two routes and giving passengers a choice. But the trouble here is that it's sometimes difficult to get three passengers together who want to fly over the same route at the same time. For that reason, Licking County offered only one tour route this year instead of two as it did the year before.

As for the final decision on the length of the tour, it depends on the passengers' previous flying experience and cost. However, the Ohio Aviation Board has found that a 60 mile tour in 30 minutes is (*Continued on page 50*)

The Air Tour dramatically proves the value of the airplane in land surveying by pointing out overall views of soil erosion.

Another phase of the tour is flying over passengers' property and showing farmers how contour cropping looks from the air.





JATO gets the newest P2V's off aircraft carriers with heavy armament and electronic gear loads.

P2V *Neptune*

With 3,250-h.p. compound engines, the Neptune is a fast, deadly, long-range aerial arsenal.

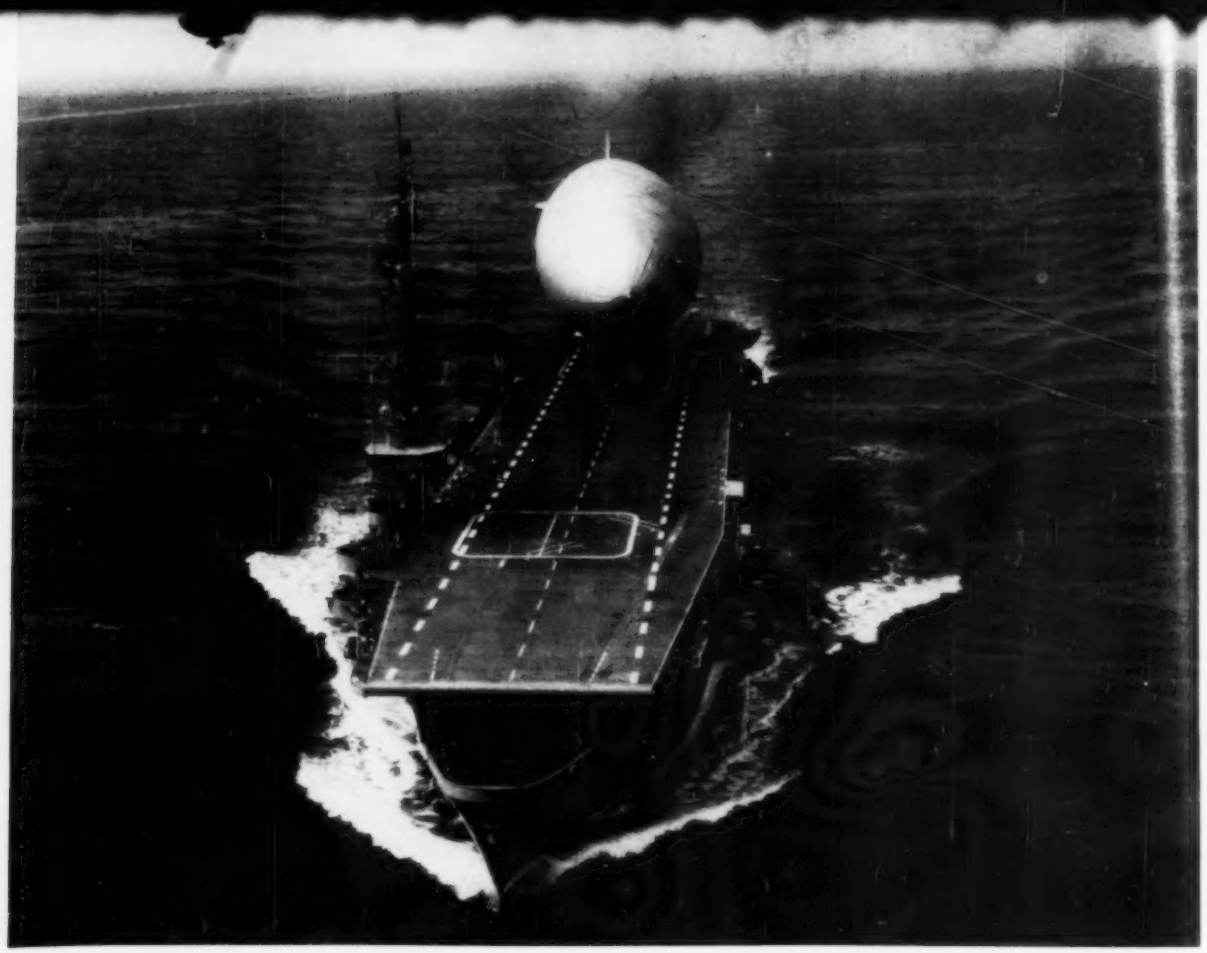
ALMOST six years ago, a Navy P2V *Neptune* nicknamed the "Truculent Turtle," flew from Perth, Australia, to Columbus, Ohio, to establish a non-stop, non-refueling flight record of 11,236 miles. That record is still on the books.

Today, the descendants of that famous long-range Lockheed are still wearing the U. S. Navy's colors, and as P2V-5's, will also soon break out the colors of Great Britain and Australia. And, under a policy permitting release of certain key U. S. military equipment to friendly nations, special interest in this airplane also has been shown by South Africa, Canada, New Zealand, and the Netherlands.

Latest in the *Neptune* class, the P2V-5 continues the concept of aerial anti-submarine warfare developed by the Navy and Lockheed in the P2V series. P2V's already are patrolling both East and West Coasts, as well as the Korean area of battle; earlier versions have operated in Alaska, Newfoundland, and the Panama Canal Zone. Always their special mission is protection from ocean-borne attack, as that of the nation's newest, high-performance interceptor fighters is defense against air attack. A 4,700-gallons-of-fuel capacity provides extreme range which permits P2V-5's to roam far from shore and, with radar and electronic instruments, to search out and intercept enemy intruders.

This newest version of the P2V, designed to operate from aircraft carriers with JATO assist, is distinguished externally from its predecessors by the addition of a nose turret armed with cannon, and by two centermounted tip tanks at the extreme end of the wings. The P2V-5 carries appreciably more radar and electronic equipment, in addition to its heavy armament, than any previous model. However, its range, speed and other performance characteristics are substantially the same as earlier types.

In its primary role of sub-killer, the P2V-5 can draw an exact bead on a sub with radar and sonobuoys. A pattern of sonobuoys dropped on the water will not only indicate position of a submerged sub, but show its path of attempted escape. For the kill, the P2V drops torpedoes. P2V's were the first production airplanes to adopt compound engines, two Wright R3350 types, with water injection, being used. Each engine develops 3,250 hp. on take off. END



Ability to land on carriers and to refuel in flight from surface vessels has extended range of K-type airship shown coming in for a landing.

BLIMPS make a COME-BACK

By JAMES H. WINCHESTER

FOR A brief 30 seconds, a telltale pip on the radar screen indicated a tapered silhouette on the surface of the rain-splashed, white-capped sea 1,000 feet below. The radar observer in the big silver United States Navy blimp continued probing through the murky gloom of the late afternoon rain squall but now the image had disappeared. He unglued his eyes from the scopes and reported tersely: "Unidentified radar contact disappeared from screen."

The second pilot swung hard on the rudder control to bring the blimp over to the right. Quickly the command pilot issued instructions to the radio operator in the car behind him and simultaneously sounded the alarm bell that sent the crew to battle quarters.

By the time the blimp, wallowing in the fitful gusts of the storm, reached what the navigator judged was the spot where the radar contact had disappeared—the very disappearance indicated it must be a hostile submarine, since no friendly subs were in the vicinity—responses to the alert were beginning to come in by radio. Two destroyers were on the way.

Now it was the blimp's job to locate the submarine accurately, to determine its course if it were attempting a getaway and to mark the course for the killer bombers and surface craft converging on the area.

The second pilot swung the rudder to take the airship on a "hunter circle"—very much like a hound dog trying to pick up a lost scent. The first pilot wrestled with the elevator controls to keep the airship on an even keel. The navigator stood behind the electronics board watching the radar man. The command pilot listened with headphones for radio contact reports while he scanned the sea with binoculars. The second rigger was on the machine gun platform just over the pilot's head. Up in the nose a crewman crouched with his hands on the bomb controls. Farther back another crewman placed a flare in one of the two extending tubes and a sonobuoy in the other.

The crewman at the tubes tripped a lever and the flare hurtled down to light up the ocean. A second later the sonobuoy shot down and began sending out signals to guide the approaching bombers and destroyers.

Now began a game of hide-and-seek. In a few minutes the blimp's electronics devices showed another trace of the craft—this time a quarter of a mile away in a southeasterly direction. Two more flares were dropped. (In good visibility, colored dyes, instead of flares, are used to mark a suspicious area.) From the position and spacing of the three flares, the bom- (*Continued on page* 43)

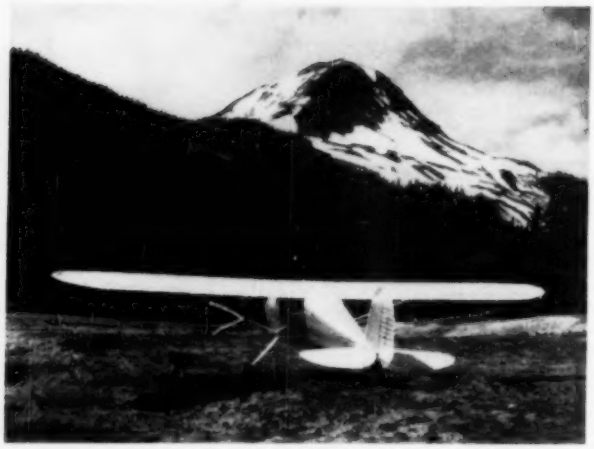
Designed specifically for long-range anti-sub patrol and detection work, the *Nan* (above) is the largest and latest blimp. The only model flying, tail surfaces are set at a 45° angle and the 1,300 hp. engines are inside gondola. Below a K-type ship is paddled in.

With the advent of jet and supersonic planes, the blimp was being relegated to a life of obscurity. But with new electronics and detection technique, it is again a useful part of the Navy's air world.

You Can Survive

A little Boy Scout know-how will help in a forced landing in isolated country.

By HARALD H. PROMMEL



Here in this high mountain valley, a rancher and his son found undamaged airplane. The pilot and his passenger could have survived, but both men died for lack of survival know-how.

THE Cessna 120 knifed its way into the clear morning sky over Durango, Colorado. Its pilot, Dr. John Button, picked up his heading for Tulsa, Oklahoma. His passenger, Robert Eakes, sat alongside nonchalantly.

Thus began a story that ended some three months later on a small mountain meadow in the rugged Colorado high country.

Ironically, it never should have happened.

Failure of the doctor's plane to arrive at Tulsa launched a three-week, four-state search. But it was not until early June that a Colorado rancher and his son discovered the plane. Excepting a bent propeller, it was virtually undamaged. The following day the bodies of the two men were found between four and five miles from the plane. Both had frozen to death.

There is a powerful, macabre fascination about death which, to the casual bystander, makes the place where a man died far more interesting than the place where the same man lived. We, too, felt that same fascination as we looked out over the lush green valley which had so recently claimed two lives.

And then something changed that feeling. Out of idle curiosity came amazement and disbelief. It shouldn't have happened! How *could* it happen?

We tried to put ourselves in the doctor's place. We tried to imagine the valley in a raging blizzard, covered with five feet of cutting, blowing snow, and we wondered how many out of, say, 100 pilots could have survived, and how many would make the same two mistakes in judgment that cost the doctor and his passenger their lives.

We put that question to a test. The answer was alarming. Out of the forty-two men we talked to, less than ten percent honestly thought they could have come out alive.

So we're asking you, Mr. Pilot—you who perhaps utilize your airplane by flying over rugged, roadless terrain—could you survive if it happened to you?

Well, take a look at the facts, but look at them objectively.

Dr. Button was a good pilot. Dr. Button landed his airplane in five feet of snow in a raging blizzard, and the only damage was a bent propeller. And he also kept a log. It was found on his body, and its few brief entries tell the story eloquently.

> *"Departed Durango 6:15 A. M., February 28, 1951. Clear sky to Pagosa Springs, when encountered clouds. Flew north to Upper Piedra. Clear area. Climbing turns to 15,000 feet. Storm nearing. Northeast. Clear on top.*
>
> *"Radio report Alamosa clear with scattered clouds at 3,000 feet. Started over pass.*
>
> *"Cloud banks rose until we were engulfed. We tried heading back. 260 degrees west at 14,000 feet. Came out of clouds* (Continued on page 52)

Survival kit should include rope, string, matches, candle, knife, bucket, canteen of water. "Little" things you may not have on hand but on which your life may depend.

No matter how wet wood is, it will burn when it dries and reaches combustion point. Use candle to light fire when you're low on matches—that way you need only one.

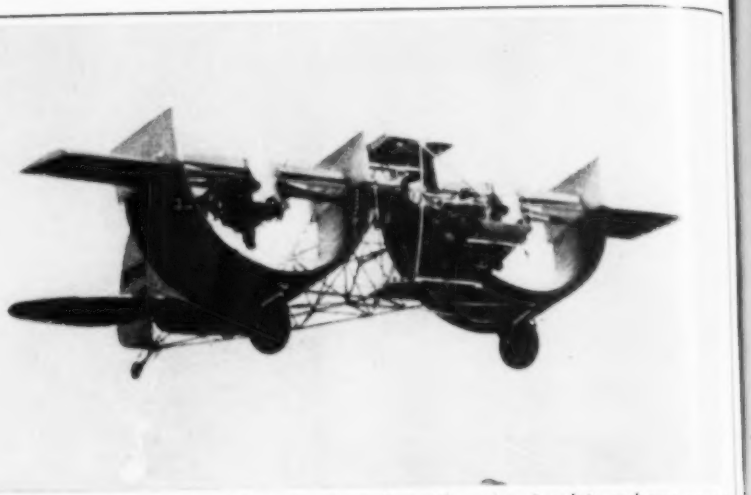
Pine cones and dead pine needles are the two best things for starting a fire when you're stranded in cold mountain country. These can be used even after hard rains.

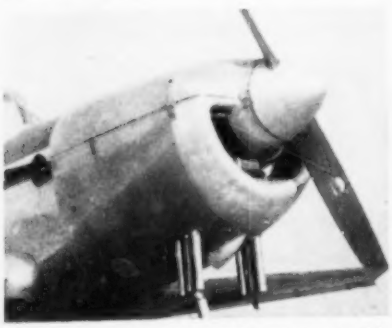
Army Field forces plans to buy new 3 to 6-seat Doman LZ-5 helicopter for user-service test evaluation. Speed of 105 m.p.h. and 260-mile range will be created by dynamically-balanced rotor system and cab-over engine set-up. With 4,419-lb. gross weight, uses are varied: such as a four-litter rescue craft.

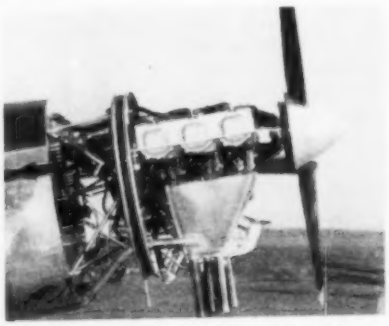
HAVE YOU SEEN?

World's first Delta-jet operational aircraft was flight tested recently. All operational and armament data of the British Gloster GA5 are secret, but it is powered by twin Sapphire engines. The low aspect ratio of Delta wing provides minimum change in stability and control characteristics at sonic speeds.

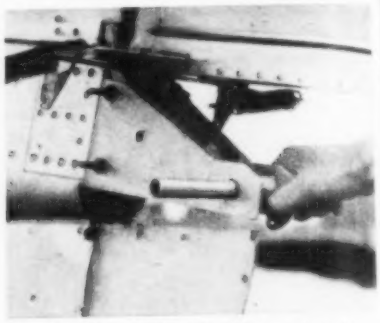
Taylorcraft is the first aircraft manufacturer to contract with the Custer Channel Wing Corp. for a license to manufacture both military and private aircraft based on the Channel Wing design. The first type that will be projected on an experimental basis will be a military aircraft that will comply with the Air Force specifications for a liaison aircraft. The principle of Channel Wing is that lift is created by air which is moved over the airfoil, drawn or sucked by the propellers, thus creating a powerful lifting force on the lifting surface without forward motion. Thus, the aircraft is able to create vertical lift, hover in mid-air, slow down and speed up at the will of the pilot, states Willard Custer, designer and builder of the experimental Channel Wing. The first military model will carry a pilot and three fully-equipped combat soldiers or two litter patients and one medical attendant. It will have at least five hours cruising range and be able to take off and land on unprepared surfaces. The useful load will exceed 1,000 lbs. Mr. Custer also feels that when the full usefulness of his design is applied to aircraft, it could well be that such aircraft will supersede the airplane, the helicopter and the wheeled vehicle, since it will be able to go into inaccessible places where other means of transportation cannot go. C. Gilbert Taylor of Taylorcraft feels that "The Custer Channel Wing is the first change in basic design of aircraft since the Wright Brothers, and that complete new formula for aerodynamics may have to be developed together with engineering data and new operating rules to cover the aircraft that is now in the process of development." The company feels that the plane would be ideal for Korea-like terrain, since it has high speed for quick approach with rate of climb of 1,000 feet.



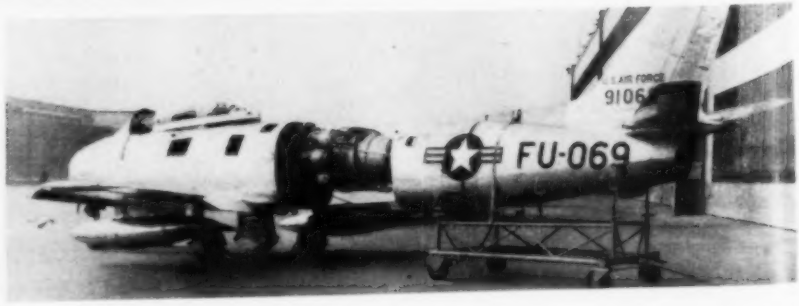




The only de Havilland *Chipmunk* powered by a Lycoming 0-435 engine is shown at the right. Of interest is the special two-piece cowl (left) and the extra long exhaust stacks. The cowl is quickly removable for easy repair since it is held in place by only 4 fasteners. Originally powered by Gipsy engine, company has been testing ship with new American engine.



Fred Miller of Brooklyn Skyport has designed one-pound aluminum handle which supports entire weight of all-metal seaplane. Aids in docking and tie-down.



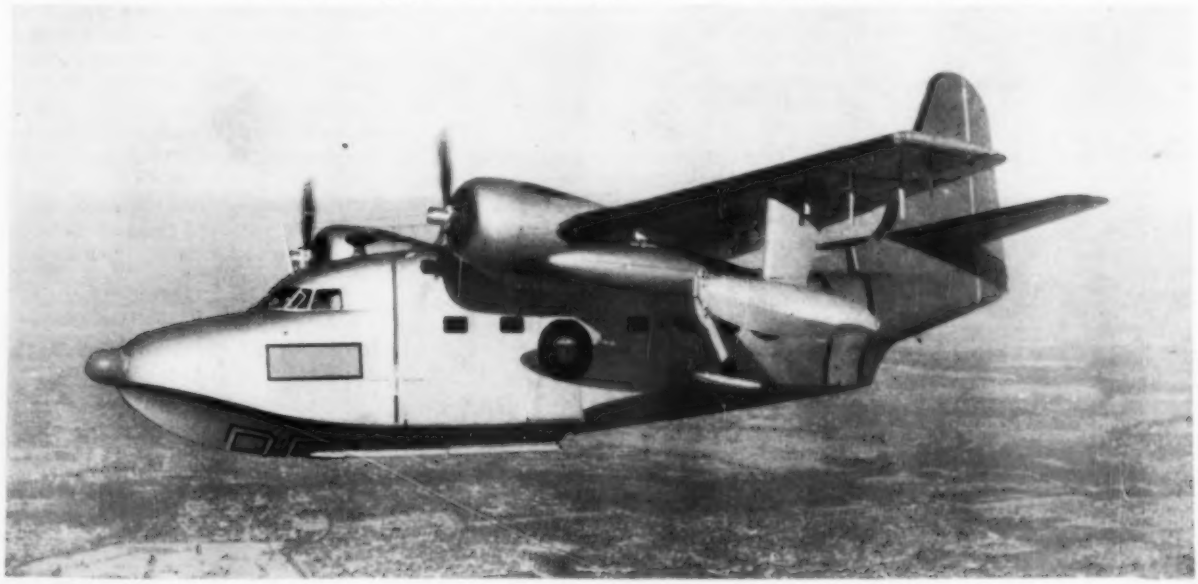
The Avro CF-100 long-range, all-weather fighter is shown above with the new radar nose installed. Powered by the Orenda engines, first all-Canadian engine, it is being used as a test bed for the powerplant. So successful have the trials been that the USAF is experimenting with the Orenda in its own F-86A, in conjunction with the Avro company. A cutaway of the engine installation is shown at the right. It creates over 638 m.p.h.

The French authorities thought it would be a good idea to develop a series of lightplanes that could be constructed by amateurs and sold to them in kit form. Along these lines, they designated Avions Jodel to develop both a single and two-place light airplane in complete kit form. The success of the venture is shown since to date over 100 of these kits have been purchased by both individual pilots and hobbyists and by flying clubs. The single-place version is available with a choice of three engines: either a 25-horsepower, a 34-horsepower or a 25-horsepower German Volkswagen automobile engine. The two-place model, similarly, has a choice of several engines. The single-place airplane has been nicknamed *Bebe Jodel* or *Baby Jodel*. The version shown in the picture is powered by the 34-horsepower engine, a British A.B.C. Scorpion. The official designation of this model is the D-91. This airplane has a top speed of 105.5 miles per hour. Its cruising speed is 93 miles per hour. It lands at a comfortable 31 miles per hour. The take-off run of the *Bebe* is fifty-five yards and the landing run lasts for eighty-seven yards. The rate of climb is listed as being 787 feet per minute. Range is said to be 250 miles. The gross weight of the aircraft is 594 pounds and the empty weight is 352 pounds. The wing span is twenty-two feet from tip to tip and it is seventeen feet six inches in its overall length. Constructed of all wood, the plane has both plywood and fabric covering. The two-place model is similar in appearance except, of course, for the increase in the size. The kits have been so well received over the world that the Avions Jodel Company is currently working on the development of a three-place version of this same type of lightplane. No prices are available but they appear to be a saving.

Powered by a Continental 90-hp. engine, the new Morrisey *Nifty* is a two-place tandem featuring tricycle landing gear. The plane is said to have a short take-off run and good stability. If further tests are successful, it may be produced in 1952.

A plane owner in Long Beach, California, has installed the controversial tandem landing gear on his Piper *Pacer* 125. Believed to be the only civilian Piper so equipped, its owner claims it makes for even more landing stability than previously.

Pictured in flight, the Grumman *Albatross* Triphibian reveals the features added to adapt its operational stability on snow and ice as well as land and water. Each float has been equipped with a small outrigger ski and the hull redesigned for a retractable flat ski.



Potential dangers may result from deviations on your compass caused by a seemingly trivial oversight

I Learned About Flying From That NO. 146

Author Youngdahl might have learned a lesson through another's error but wound up with "experience being the best teacher."

By DAVID YOUNGDAHL

DO YOU remember reading the article published by a well-known weekly magazine a year or so ago describing the harrowing experiences of the crew and passengers of a forced-down RCAF C-45, while attempting to walk out of the Canadian bush? If so, you will no doubt recall that with their radio equipment out of order, they became thoroughly lost and ran out of gasoline because of an erratically performing magnetic compass. Later, one of the crew discovered that a passenger's metal hatbox was the cause of that instrument's aimless meandering.

In reading the account, I was vividly impressed by the magnitude of the potential danger sometimes inherent in a seemingly trivial oversight. An error of omission, incidentally, of which we may all be guilty now and then.

I should have learned something about flying from that, notwithstanding the old adage about "experience being the best teacher." In the hope that I did, despite some evidence of doubt, I'm going to tell you of an incident I experienced.

I was engaged by an elderly miner a few weeks ago to fly him and about four hundred pounds of supplies from Bisbee, Arizona to his airstrip in the mountains of Southeastern Sonora, Mexico. I have never been in the immediate vicinity of Bacanora, our destination, although I am familiar with parts of the North-Mexican states of Sonora, Chihuahua and Sinaloa.

The inaccessibility of towns, villages, ranches and mines due to the lack of railroads or highways, creates a favorable demand for charter service in Mexico. In fact, Mexicans are more air-minded than people in the U.S. despite a way of life otherwise outmoded here 50 years ago.

Because of a few last-minute purchases, including a five-gallon jerry-can of gasoline, we did not get loaded and ready to leave Bisbee until late in the day. We phoned the appropriate U.S. agency of our intended flight; and took off for the Mexican town of Agua Prieta, a port of entry, 15 minutes away. Were cleared there by the Mexican customs and immigration officers with the usual prompt and courteous inspections.

Meanwhile I had noticed threatening weather in the making, south and east of us. There was sufficient daylight remaining—with an ample margin—for the flight to the mine that afternoon but I was reluctant to get underway. I am well acquained with the July and August widespread, afternoon thunderstorms. They are an almost daily occurrence. As nowhere else on this continent, the sky is savagely ripped and torn with the fury of a dozen atom bombs exploding simultaneously. Visibility is zero; and obstructions may run as high as 9,000 feet. A rumble of nearby thunder suggested remaining where we were overnight.

After the vigorous scrubbing administered by the storms of the preceding afternoon and evening, our morning glowed with renewed splendor in true southwestern fashion as we took off from Agua Prieta at 6:15 a.m.

Climbing to 8,500 feet, I leveled off and took up the compass heading of 164°. Magnetic variation of this locality amounts to 13° E.. Although there were no check points for the first hour and 15 minutes, I was not particularly concerned about the need for precise navigation. For in the area of our destination, the topography was such that our position could easily be identified by reference to several prominent landmarks. Also my passenger assured me that he knew the country perfectly, having prospected over much of it during the past 17 years.

World aeronautical charts for this country are available; and I'm never without one. (*Continued on page* 48)

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is "To make flying more useful, less expensive, safer and more fun."

Headquarters address is Box 5960, Washington 14, D.C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

MEXICAN DEAL

On a recent flight to Mexico City, an AOPA official spent some time with an official of RAMSA (Radio Aeronautica Mexicana, S.A.), the semi-official agency in that country which now charges stiff fees to all aircraft flying in Mexico. A number of AOPA members have protested the fees to AOPA National Headquarters, and AOPA has been seeking a solution to the problem ever since RAMSA started levying the charges.

As the result of the RAMSA-AOPA conference, it is expected that a satisfactory compromise can be worked out regarding the fee problem. The RAMSA official—Antonio Pastrana, vice president—explained that RAMSA is a private, non-profit company, jointly owned by the airlines operating in Mexico. Because the Mexican government, unlike the United States, owns no radio aids or facilities, RAMSA's member companies had to install their own. Thus the facilities in Mexico all are privately owned, and controlled by RAMSA. And, because they are privately owned, RAMSA feels it necessary to charge fees for the use of the facilities.

RAMSA currently has a sliding scale of charges, covering all phases of aviation. They recognize three general categories: scheduled air transport, non-scheduled commercial and industrial flyers, and private flyers.

These are typical charges (in U.S. currency) made to private planes:

Traffic control (per landing)	$1.45
En route radio use	1.39
Air-to-ground communications (each)	.23
Hourly weather reports (each)	.23
Winds aloft (each)	.69
Terminal forecasts (each)	1.85
Route forecasts (each)	3.70

Because of the number of complaints, RAMSA established three basic types of contracts and made them available to each of the three major categories of aviation. Private owners can "join" RAMSA for a flat fee of 20 pesos ($2.31 U.S.) per month.

Shortly before the AOPA official arrived in Mexico City, George Oberdorf, manager of the Nogales, Ariz., airport, had gone to Sr. Pastrana with the same problem. After hearing the explanation of RAMSA's setup, Oberdorf suggested RAMSA permit him to sign up American pilots flying into Mexico as members of RAMSA. RAMSA officials approved the suggestion. AOPA has offered to do the same on a nation-wide basis, as a service to AOPA members. RAMSA's board of directors now is discussing the AOPA proposal. If and when it is approved, AOPA will handle members' RAMSA contracts in Washington and issue necessary credentials direct from National Headquarters.

MAP CHECKERS

Continuing its cooperation with the U.S. Air Force's Aeronautical Chart and Information Division, AOPA has just sent that Government agency a set of World Air Charts covering all of Colombia that have been minutely flight-checked by civil pilots in that country. AOPA sent the Aero Club of Colombia a supply of the charts some time ago, and pilot-members of that organization have been flight-checking and correcting them ever since. The result has proved to be a completely new picture of Colombia so far as airport facilities are concerned.

Meanwhile, AOPA is preparing sets of charts of Mexico, to be flight-checked and corrected by members of the Aero Club of Mexico under a similar arrangement.

SOME RESPONSE!

A recent routine mailing to AOPA's Active members briefly described the Radio Facilities Charts published by the U.S. Coast and Geodetic Survey, and constantly revised on a subscription basis. AOPA made the mailing just as an informative service to members.

To the surprise of National Headquarters, the mailing brought in nearly 200 subscriptions to the loose-leaf book of charts. And the $7 subscriptions are still coming in.

CUBA TROUBLE

AOPA is assembling a complete file on high-handed treatment and exorbitant fees charged civil pilots who fly to or through Cuba. One AOPA member recently reported paying nearly $300 in U.S. currency for the one-way of his Piper *Super Cruiser* through Cuba on a flight through the West Indies. He was forced to pay these charges despite the fact that AOPA had previously obtained all the necessary flight permits and clearances covering Cuba for that member.

Despite repeated efforts to put a stop to these exorbitant charges by miscellaneous Cuban Government employes, AOPA has been unable to achieve results through the usual diplomatic channels. So AOPA's Flight Service now is warning any of AOPA's 40,000 members contemplating a flight to or through Cuba to avoid that country until further notice.

Meanwhile, AOPA hopes to accomplish some results by working through the Cuban tourists commission and ICAO (International Civil Aviation Organization).

AOPA's Flight Service will welcome additional Cuban flight "case histories" from both members and non-members.

RESORT AIRPORTS

Latest edition of AOPA's Flight Service Guide covering the eastern United States is just off AOPA's presses. The new publication lists details for approximately 300 airports, and is 40 pages long. Copies are available free to Active AOPA members.

The companion volume, covering the western United States, now is being completed for the presses. It will be available shortly.

These two publications represent the most complete and up-to-date compilation available anywhere in the country. They were made possible because of the cooperation of individual AOPA members, airport operators, state aviation officials and CAA personnel.

GAS DOPE

A recent Government order has changed the specifications for aviation gasoline somewhat. In an effort to determine what effect the change will have on the engines of civil aircraft, and what plane owners can expect from the modified gasoline, AOPA obtained comments and advice from a cross-section of the country's leading oil companies and engine manufacturers.

Those comments now are being assembled into an AOPA Special Report, which soon will be available free to members on request.

MORE STREAMLINING

Just as this issue went to press, AOPA started working with CAA, Customs and Immigration in an effort to set up the simplified border-crossing procedure for pilots flying across the Mexican-United States border in much the same manner as is now in operation along the Canadian border.

The system now in use along the Canadian border permits pilots entering the United States to file a single flight plan which, in turn, the CAA transmits to the nearest Customs and Immigration authorities.

Strange Field

(Continued from page 23)

mine maximum, gross weight stalling speed. This maneuver is necessary to familiarize the pilot with his airplane characteristics under take-off conditions. Take-off trim, power and altitude should be used. Handle the controls gently and raise the nose until the stall is reached. Make a mental or written note of the air speed indicated at time of stall.

If the airplane is equipped with retractable landing gear and flaps, maximum gross weight stalling speed should be analyzed under the following conditions: Take-off power; wheels down; flaps set at best lift-drag ratio. The last-named item is a setting established by the manufacturer. Use it to obtain the additional margin of safety needed for the critical moments following the strange field take-off.

Next comes a series of ground tests. With take-off gross weight and stalling speed known, we want to learn how much runway will be required to achieve that speed, get off the ground and clear a 50-foot obstacle. Here is a step-by-step formula: Add 20 percent to take-off stalling speed. This is standard procedure for arriving at a safe take-off speed. For example: If you found that your airplane had a take-off power, maximum gross weight stalling speed of 55 m.p.h., your safe speed to leave the ground would be 66 m.p.h.

Then, correct and set altimeter. Make a note of the altitude and outside air temperature. Let us assume this to be sea-level with a temperature of 60°. Taxi the airplane onto the runway. Line up the wheels on some pre-arranged reference point. Station an assistant upwind to observe your approximate point of take-off. If flaps are to be used, lower them to the desired position.

Next, set the brakes and run up the engine to take-off power. Release the brakes. Allow the stick to find its own trim and concentrate on rudder control. When the airspeed reaches the predetermined figure, 66 m.p.h. in the above example, pull the ship off the ground, maintaining safe air speed until the airplane has hurdled an imaginary 50-foot obstacle.

When the airplane is clearly airborne, raise the gear. Milk up the flaps and ease the ship into a normal climb. Return to the ground and confer with the assistant. One or two more attempts may be necessary before he can pinpoint the exact spot where the wheels left the ground.

Measure the distance from the start of take-off roll to point of take-off. Let us assume that this totals 805 feet. Now what do we have?

We know: 1) Safe take-off speed—66 m.p.h.; 2) distance required to attain take-off speed at a specified altitude and at a known air temperature—805 feet. But our initial purpose was to find a technique for getting off from a strange field and clearing a 50-foot obstacle. Here's how we allow for that.

Veteran pilots have established the rule that distance required to leave the ground is 70 percent of the total needed to clear a 50-foot obstacle. In other words, the formula: Distance to leave the ground: $x=70:100$. Or $805x=7000$. In this case, $x=1151$. So our take-off run under the above conditions must begin 1,151 feet from the 50-foot obstacle.

One or two more factors yet must be considered before the pilot is prepared to cope with any strange field situation. Take air temperature. We know that warm air is thinner than cold. And this "thin" condition affects take-off performance the same as increased altitude. To compensate for temperature variations, add or subtract 10 percent to or from the total distance required to clear a 50-foot obstacle for each 30° change in temperature.

Distance, i.e., required at sea level, 60°, is 1,151 feet. If outside temperature reaches 90°, we add 10 percent to 1,151 feet to arrive at 1,266 feet. Conversely, should the temperature drop to 60°, we subtract 10 percent from 1,151 feet for the figure 1,036 feet. This 10 percent is a temperature factor only and applies regardless of altitude. Altitude variation is another matter and shall be considered in our next step.

As we have already seen, the airplane will stall at the same indicated air speed regardless of altitude. But the distance required to attain a given airspeed will vary as the air becomes more or less rarefied.

To compensate for altitude changes, use the figure 12 percent for each 1,000 feet. Do not confuse this with the temperature figure. *Determine altitude variation only after considering the temperature factor.*

For example, a theoretical altitude of sea level, temperature 60°, distance required to clear 50-foot obstacle, 1,151 feet. Actual temperature, 90°. Applying the 10 percent temperature correction, our new distance required is 1,266 feet.

We learn that our real altitude [illegible] feet. Apply correction on the basis [illegible] percent, or 48 percent. Multiplying [illegible] feet by 48 percent we find that our take-off will require an additional 608 feet or a total of 1,874 feet. Simple calculations will show that the higher elevation may consume twice the take-off distance needed at the lower levels. Little wonder that wandering pilots experience embarrassing and sometimes serious accidents when leaving a strange, high-mountain field.

Having considered the effect of temperature and altitude, we must not overlook the surface condition of the field. All of the above is determined on the basis of a hard runway. Because of the many factors involved, no one rule-of-thumb is possible which would cover all airplane types. But do not fail to allow for the additional distance which will be required when the surface is grass, mud or some other high-drag agency.

So far, each step has tended to increase the distance necessary to clear a 50-foot obstacle. But there is one remaining variable which stands very much in our favor: wind. After all the above calculations are made, apply a 10 percent correction for each 10 m.p.h. of wind velocity. For instance:

You have applied the above figures and see that you need 1,874 feet of runway. But the wind is blowing at 20 m.p.h. Deduct 20 percent—375 feet—from 1,874 feet. The result—1,499 feet—represents the final distance required to clear a 50-foot obstacle under the foregoing conditions.

Let's make a quick review to determine the complete process for arriving at a strange field take-off technique:

1. Compute airplane gross weight.
2. Find maximum, gross-weight stalling speed with the airplane operating under take-off conditions.
3. Add 20 percent to find "safe" speed.
4. Noting free air temperature and altitude, measure distance required to attain "safe" speed from a standing start.
5. Using the formula, distance to leave ground: $x=70:100$, find distance required to clear 50-foot obstacle.
6. Make temperature correction—10 percent plus-or-minus for each 30°.
7. Make altitude correction—12 percent for each 1,000 feet.
8. Allow for surface condition.
9. Wind velocity—decrease total distance required 10 percent for each 10 m.p.h.
10. *Don't overlook this one:* Measure the total distance available for the airplane to take-off and clear the 50-foot obstacle.

Depending upon your ability as a pilot and assuming that your airplane possesses no unusual characteristics which would nullify the above calculations, you may rest assured that you can achieve a safe take-off provided that your measured distance is adequate for the requirements as dictated by the existing conditions.

If so, lock the brakes, ease the engine up to take-off power, release the brakes and let 'er go. END

★ A FLYING TIP ★

A GLASSY-WATER landing for seaplane pilots has always required special care. This is due to the difficulty of accurately judging one's altitude with relation to the surface of the water.

A technique found helpful on clear days and in the absence of nearby shore references or floating objects is to make the approach in such a manner that the shadow of the aircraft is visible to the side or obliquely ahead of the aircraft. The relation of the shadow to the aircraft can be used in estimating the proximity to touchdown. When the shadow appears to meet the plane, you're there.

Wind direction is not a factor in planning the approach, for the glassy appearance of the water shows that wind effects are negligible.

—Jackson C. Stear

THE MAIL BOX

AW, SHUCKS . . .

In every city and just about every town of any consequence in the United States you will find a copy of the magazine FLYING.

The *Gentleman's Magazine*, issued in London in 1731, was the first published, but to me the periodical publication of FLYING has risen to an apex of achievement in its field. It breaks down aeronautics and gives the average person a better understanding of aviation.

I want to express my thanks to you and your staff for the many hours of pleasure and valuable information I have gotten from your magazine.

RAY DOC VOWELL

Denver, Colo.

● *Gee, thanks.*—ED.

CHALLENGE ANSWERED

In reference to the letters in The Mail Box of late challenging me to meet with London spotters, I regret to say that being far away from there, it is hard for me, much as I wish, to accept.

However, if at any future date, I get to England I shall be glad to go and have a smack at the Royal Observers Corps Master Recognition Test.

Furthermore, I shall bring along my own master recognition test which consists of no less than 650 aircraft. All I have to go by is the aircraft's tail and nothing else. Perhaps Mr. West (December Mail Box) will be interested to know that I never tried to spot an aircraft within three seconds. There's no hurry since aircraft recognition is just a hobby with me and nothing more. Certainly the ability to correctly identify 1,015 aircraft (no matter if I take three seconds or three minutes) is unusual.

RENE CHARETTE

Ottawa, Canada

● *We think it's pretty good, too.*—ED.

LITTLE STINKER'S ADOPTED

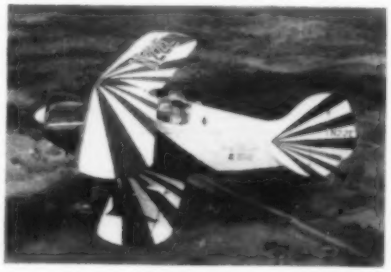
Every pilot knows the thrill of his first solo flight, but I have just had the biggest thrill of my life. Betty Skelton agreed to sell her *Little Stinker* to us if we would promise to be good to her "baby." My husband Bob gave the ship to me for an anniversary present, but said I wouldn't be able to fly it until I logged more time. I have a private license, but a bare 40 hours in an *Aeronca*.

I decided to taxi the ship on our grass strip to see how it felt. After 15 minutes of taxiing, I couldn't resist the urge, so I opened the throttle and before I knew what had happened, I was leveling off at 400 feet.

I felt as though I was going at least 200 m.p.h. Bob had told me the controls were sensitive compared to what I was used to. Just a little pressure and I was making a sharp turn. I climbed up to 1,000 feet and thought I had better fly around for a while before I tried to land.

I glided, climbed, did some stalls and flew around the local airport, hoping my friends there would know it was me. They did, but weren't too happy about it.

After about 30 minutes, I felt it was time to get back on the ground. Everything worked fine until I tried to land 20 m.p.h. faster than the *Little Stinker* was accustomed. When she was ready, WE



landed and she only shook her head a few times.

I taxied back to the end of the strip where my husband was waiting. I felt fine until I got out of the plane. My knees turned to rubber and shimmied something awful. I had flown the little thing and didn't even put a scratch on it. I'm afraid the old *Aeronca* is going to get dusty now!

RUTH DAVIS

Bloomington, Ill.

EXIT EXODUS

In Hy Sheridan's "Logging Time" (FLYING, October 1951) the first item criticized the red letters stenciled on DC-6's and DC-6-B's: *Emergency Exit. Do Not Use in Flight.*

Is it not possible for a person to safely use these exits for emergency use in a crash landing or ditching after the plane is on the ground or water even if it is dangerous to use it in flight considering propellers, etc.?

JOHN PREY

Oglesby, Ill.

● *Hy Sheridan says: "The fact is that I didn't criticize the stencil. I think that it is wonderful. You see, John, we don't have any parachutes in the Dizzy Six airplanes—on the airlines, at any rate, and the window opening is too small to take the seat pack anyway. The situation reminds me of a sign that was supposed to have been placed over a pile of coal dust briquettes in the small town of Donegal, Ireland. The sign said:* Use only in case of fire."—ED.

ENGINE ARTICLES ENJOYED

Your recent articles "How to Start that Engine" and "How to Run a 100-Hour Engine Check," by Ralph Korngold were very well received. Let's have more.

Perhaps I am prejudiced as I am the one who sold Mr. Korngold the old OX Travelair after reconverting it from steampower. I do know, however, that Ralph knows his business, as I flew many of the ships he maintained at Oakland Airport when we were flying *Great Lakes*, Rearwin 60's and 90's, 40 *Cubs* and Stinson SM8A's.

GORDON H. FOUNTAIN

Berkeley, Calif.

Have just finished reading your December 1951 issue of FLYING and find that I have been right all along—FLYING is the best ever.

"How to Run a 100-Hour Engine Check" was wonderful, wonderful, wonderful. Let us have more articles like this one. The pictures were super, too; the more pictures the better the story.

LUTHER JOE PYBUS

Amarillo, Texas

● *Thank you, thank you, thank you. We intend to continue publishing these "how to do" articles, and are happy to hear that they are well received.*—ED.

AUTHOR IN DANGER

Before the savage section of the British population (known as aviation enthusiasts) drags me from my bed and strings me by my heels, may I correct a few statements appearing in my article "Britain's Bid for Air Supremacy" in the December issue of FLYING.

The airplane illustrated on page 19 is the Avro 707B not 707A as stated. The *A*

has wing leading edge intakes. I think it only fair to point out on page 20 that the J-65 is the British export name for the famous Armstrong-Siddeley *Sapphire*. I put it this way to beat the energetic PRO of Armstrong-Siddeley to the gun. Actually, an engine test bed *Canberra* B.Mk.2 was shown as well as the *Pathfinder* or target indicator B.Mk.5 also powered by Sapphires, alias J-65.

The ground attack *Meteor* is a "private venture." Normal *Meteor Mark* 8s do not have the wingtip tanks or 24 rockets. Also, it should be made clear that only the outer Merlins were replaced by turboprop *Proteus*.

CHARLES W. CAIN

South Kensington, London, England

● *In all fairness to Mr. Cain, sometimes we editors have a heavy hand and we share the blame for some of the misinterpretations.*—ED.

(*Continued on page 45*)

Ceiling Zero

(*Continued from page 21*)

hand, sprays its target with a nearly-constant stream of radiation. For this reason, and others too technical for discussion here, FM remains in constant touch with the target and can, thus, measure fast speeds and small, critical distances at which most pulsed radars would go blind.

The pulsed-type SPN radars which are used to bring the landing planes into the proper position for the approach send out a searching pulse. Then the transmitter circuit is shut off while the receiver circuit listens for the return echoes. This on-and-off switching is called "duplexing." The time lag between the pulse and the return of its echo from the target is measured in terms of range, or distance. Both the transmission and reception are usually handled by the single antenna.

The twin antennas used by FM equipments scan a narrow beam directly to the rear of the carrier. It is along this glide path that the pilot makes his final approach. One antenna radiates the constant signal from the transmitter unit. This signal is modulated up and down over a fairly wide frequency band. Some of the signal energy spills over into the second, or receiving, antenna. Since the frequency of the signal changes continuously with time, there is a frequency difference between the initial, "spilled" signal and the signal reflected from the target. Time lag makes a "beat," which the circuits measure in range terms.

When the pulsed radar transmits, the duplexing shuts off the receiver. Although this pulse may last only a few millionths of a second, the airplane target —as seen ultimately on the scope—may have traveled the equivalent of several yards. Moreover, a target echo that bounces back before the transmitter has finished sending and before the duplexer has opened the receiving circuits finds itself locked out, as it were. It cannot get in to appear as a pip on the radar scope. An FM echo always finds its receiver open, on the other hand, because of the separate antenna and reasons of circuit design. Thus, FM equipments have a positive, speed-sensing ability that makes the difference—in terms of a few critical yards or a few miles per hour—between a safe landing or a crash.

The use of jet aircraft is making this speed-sensing factor so important that the FM part of the approach system may soon be used by Landing Signal Officers even in clear weather. LSOs are finding it increasingly difficult to judge the speed of landing jets during that final 200 yards.

By the appearance of a plane's propeller disk, among other things, an experienced LSO can judge accurately and consistently the closing speed of a piston-engined plane. But the cleaner lines of a jet do not provide such a good visual reference target. A Panther gliding in at 115 knots looks the same at 200 yards—or even at 100 yards—as one approaching at 90 knots. Thus, it is frequently difficult to judge, until too late, whether a jet is coming in too fast or too slow. The FM gear will make the LSO's task a lot easier. (In the meantime, current practice is to steam the carrier at full speed and land the jets a trifle on the fast side. In these hot landings, however, there is always the likelihood of a jet missing the cables and crashing into the barriers.)

In actual practice, the CCA procedure appears deceivingly simple. The controller gets the range and bearing of the landing planes from the SPN radars. He vectors the planes into the proper traffic pattern—and spotting the craft into just the right position along their downwind and base legs is vitally important in setting up their approach. The AC directs the planes to a point about two miles astern, where they are picked up by the FM gear in addition to the SPN radars.

The pilot flies in at a very shallow angle of glide, using 40 to 55 per cent power in the case of jets. He watches the "altitude limit" light of his FM radar altimeter to ascertain whether he is coming in too high, too low, or just right along the glide path.

The AC has, meanwhile, made settings on the console to correspond to the carrier airspeed and the proper landing speed for the particular type of airplane. Radar data concerning the glide of the airplane is "put in" and computed on the basis of the settings. The AC watches three lights for his "output" information. So long as the pilot's approach is just right, a white light indicates *speed correct*. If the plane gains too much speed, a green lamp glows *speed too high*, and the AC corrects the pilot by radio. Should the approach speed fall below safe limits, a red *speed too low* lamp lights up. When the pilot is close enough to see the LSO, he follows the normal landing procedure. And when the new deck-gaging attachment becomes operational, he can be talked all the way down in darkness or visibility too poor for him to see the LSO.

The FM computor unit which makes this possible is an interesting device that works just like a bombsight in reverse. As a plane makes its run on a target ship a bombsight of modern type computes, among other factors, the target's slant range and "range rate" (or rate at which the slant range closes towards the attacking plane). By putting roughly the same basic computing device aboard a ship and using it to range approaching aircraft, Navy scientists achieved the bombsight effect in reverse. And as a matter of fact, the FM speed-sensing equipment was originally adapted from the once-secret LAB (Low Altitude Bombing) gear called "Sniffer." Because "Sniffer" may still prove to be a formidable weapon against submarines and surface vessels on the prowl at night, it can be mentioned here only as a technique for blind rocket firing and low level bombing against hidden targets. But the adaptation of "Sniffer" works even better in behalf of hidden airplanes that want to land on flattops the pilots cannot see.

FM radar uses, together with its modulation, another interesting principle known as "Doppler" effect. This has to do with the physical phenomenon where by the pitch or frequency of sound or electrical vibrations undergo an apparent change with the movement of the object from which these vibrations (or radio echoes) originate. Sound-wise, this effect causes you to hear a siren or locomotive bell change pitch as it passes. The sound of a passing airplane overhead illustrates the tone change even better. Since this Doppler effect affects the receiving frequency, the speed of the object reflecting the radio echoes can be measured accurately. Continuous wave radio devices can also measure Doppler, and this scheme is widely used in the tracking of missiles. But modulation of the signal is necessary to measure range. It is to little avail to know how fast the airplane is traveling if you cannot determine how far away it may be. The CCA equipment, by using the combination of modulation and Doppler, gives a precise indication of distance and closing speed.

CCA holds considerable tactical significance for the aircraft carrier. Planes can be handled more efficiently in good weather and operated around the clock in any weather whenever necessary. The ability of flattops to keep operating at night or in foggy weather hunter-killer patrols will make our anti-submarine operations 100 per cent more effective. CCA will add considerable tactical mobility to the fast carrier task forces. Air strikes can be launched consistently at night. And strikes can be dispatched from distances off-shore while the flattops hide under the cloak of frontal weather areas from landbased enemy aircraft. CCA can bring the friendly planes back safely. The carriers can defend themselves, and the other ships of the fleet, better at night by keeping aloft combat air patrols and "pickets." And further into the future, the flattops can send mother planes up into any weather to effect terminal guidance of ship-launched missiles. END

Alarm-clock Navigation

(*Continued from page 27*)

a busy fellow, should welcome an instrument will will take part of the load from his hands. There are moments in instrument flying which require the pilot to be almost an octopus—one arm for flying, one hand for operating computer, one for operating loop, others for tuning radio, holding mike, instrument let-down procedure book, etc. In instrument flying, just in the situation where the pilot has least time to spend working a computer, he is most dependent upon it since pilotage is impossible.

In any case, for either instrument or contact pilot, it is mighty handy to be able to tell *at a glance* the ground speed and distance flown. With such an instrument one can really cover distance without drudgery. END

Blimps

(*Continued from page* 33)

bardier was able to judge the course and speed of the submarine. He calculated its probable position and dropped half-a-dozen depth charges in a wide pattern.

The blimp continued tracking, its delicate electronic instruments now indicating that the submarine, aware it was being tracked, was remaining stationary. Soon, a pair of destroyers converged on the scene, made a run and picked up indications of a submersible on their instruments. They dropped more depth charges and another "kill" was chalked up to the hunter-killer teams.

All the above is an actual quote from Navy records of a mid-sea submarine detection as achieved in a recent manuever. It is the 1952 version of how a blimp goes about tracking down an underseas enemy at sea. Few civilians, so far—largely because of the highly secret and still restricted nature of much of the electronic and detection gear being used—have been allowed to fly with the blimps on actual operations. But the Navy's doing it all the time with new and improved blimps, the biggest of which is the ZPN. Let's step up and meet her.

Nan is her name. She's the world's newest, designed specifically for long-range anti-submarine patrol and detection work. She costs about $5,000,000. The "ZP" in her name is a reminder of Count von Zeppelin, the German designer who first became interested in lighter-than-aircraft as weapons of war while serving as a German Army Observer with the Union forces in our Civil War. In tribute to him and the work he did during that war, all United State airship squadrons today are designated by the letters "ZP."

Now operating on a test basis from the Navy Airship Training and Experimentation Station at Lakehurst, N. J., she's the only model of that type now flying, although four others are under construction by Goodyear for the Navy and more will probably be ordered.

Three hundred and twenty-four feet long, the ZPN is not quite half the length of the old rigid-type *Akron* and *Macon*, the ill-fated Navy dirigibles of the '30s, which had 6,500,000 cu. ft. of helium and were 785-feet long. The ZPN, despite her length, displaces only 925,000 cu. ft. of helium. This is still more than the 725,000 cu. ft. carried by the 310-foot long "M" type blimps, which holds the world's sustained flight record of more than one week aloft without refueling. The Navy has only four of the "M" type blimps. Backbone of our lighter-than-air stable is the 253-foot long A"K"-type, which is 60 feet in diameter, compared to the 71-foot diameter of the "M" and "N" types.

Aside from the mere fact of being larger, the ZPN is still a far-different looking blimp than any other lighter-than-air type now flying. First and most noticeable new feature are her tail surfaces. They are set at a 45° angle, instead of vertically and horizontally, as on other types. A slim, 83-foot-long, double-decked control car gives her underside a sleek, streamlined appearance, a look which is helped much by the lack of engine nacelles.

On the Nan, the two 1,300 hp. engines are mounted inside the gondola. Streamlined spars angling downward from the envelope mount the newly-designed, tri-bladed Curtiss reverse-pitch propellers. Cooling of the engines is by air ducts on either side of the bottom of the gas bag. Either engine can operate both propellers.

The *Nan*, which has been under development by Goodyear since mid-1948, carries a crew of 14, as compared with a crew of four officers and six enlisted men aboard smaller-sized blimps. Her lower deck houses the controls and operations stations, and crew quarters are on the upper deck.

Beneath the gondola, sticking down like the udder on a cow, is a huge radar dome housing electronic "eyes" used for searching. On the port side of the 75-knot craft is a large, million candlepower searchlight for use in sweeping large areas of water in the darkness.

As the most effective bird dog yet developed for trailing enemy underseas boats, the *Nan*—is another important and highly regarded partner in the anti-submarine hunter-killer teams, as are all other types of the Navy's lighter-than-air complement.

Because of the vast amounts and varied types of electronic and magnetic search gear they can carry, the non-rigid gasbags are "hunters." But, if occasion demands, they can strike hard-hitting blows as "killers." They're equipped to carry depth charges, and other sub-destroying weapons, along with .50 calibre machine guns.

The development of the "N" type blimps is the latest step in a revival of lighter-than-air interest in Navy circles. However, larger ones are already being designed now. But in the Navy's low-budget days of 1947-49, the blimp was relegated to practical obscurity as the too-few dollars available for air development and research went into rockets, guided missiles and jets. As the need for steps to combat the enemy sub menace became more apparent, emphasis was shifted to long-range patrol airplanes, then to hunter-killer aircraft teams. The blimp was the last to come out of mothballs.

Lighter-than-air students are not surprised that their big-bellied pets are once again in the spotlight. When anyone acts as though the present role of the blimps is anything new or different they point proudly to World War II record books.

Capt. George F. Watson, chief of the Navy's airship training at Lakehurst, says:

"Just prior to the United States' entry in World War II, the Navy had only half-a-dozen blimps. There were fewer than 200 trained specialists in the field. But with the German submarine wolf packs sinking ships faster than they could be replaced in 1942 and with 5,000 miles of sea frontier to be patrolled, the Navy revived interest in blimps."

At the Navy's urging, Congress authorized the building of 200 small-sized blimps. By 1945, there were 14 lighter-than-air squadrons flying escort and con-

15 YEARS AGO

FROM the March, 1937, issue of this magazine.

United Airlines' Skylounge Mainliner ranks as most powerful passenger landplanes in domestic service, marking first U. S. domestic installation of the two-row 14-cylinder Wasp engines de-

veloping 1150 h.p. each. With its fully loaded weight of 12 tons, the *Mainliner* can climb on one engine to 9,500 feet and attain a twin-engine ceiling of 23,000 feet.

New Ben Jones Sportster, intended for private or sportsman pilot, can get 151 m.p.h. top speed out of its 125 horse-

power Menasco engine, has cruising range of 730 miles and sliding cockpit cover that makes it an all-weather plane.

Twin-engined Bellanca seaplane bomb-

ers, recently designed and built for the Columbian government, will carry a heavy load at high speed for hundreds of miles non-stop.

These statistics are of interest to all who believe the next great war will be fought largely in the air. Russia has 11 factories that can turn out more than 2,000 airplanes a year. Great Britain has 35 airplane factories, 14 of which are used exclusively to fill Air Force orders. Germany has 17 aircraft plants, one of which employs 15,000 men.

TWENTY YEARS AGO

Monsieur Louis Bleriot, Paris, offers a high-speed flying trophy to be won before the end of 1935 by the pilot making the fastest speed in excess of 372 m.p.h. for half an hour at a time.

voy duty around the world. At the peak of their operations, these non-rigid airships patrolled 3,000,000 square miles. In all, they escorted 89,000 ships in 55,900 operational flights, putting in some 550,000 hours in the air.

The lighter-than-air advocates' boast that no vessel was lost in any convoy attended by blimps in World War II and only one blimp was lost to enemy action. Altogether, Captain Watson points out, of the blimps assigned to the fleet units, 87 per cent were "on the line," in operation or in readiness for operation at all times. This, says the Navy, remains a record "availability factor" for military aircraft.

New search and detection gear, new designs and new techniques, particularly in refueling, now add manyfold to the blimp's value as a slow-moving or hovering "eye." Fleet maneuvers recently have done much to re-emphasize the value of the blimp. In most recent Atlantic tests, they were aloft night and day with the Fleet. They can now make a carrier landing, change crews and be airborne again in a matter of minutes. One "M" type recently remained aloft with the same crew and without refueling for 170 hours and still had enough fuel left for another ten or 15 hours.

A major shortcoming of airships in the past has been their limited cruising range. To extend the blimp's range, the Navy sometime ago began experimenting with surface-to-air refueling "on the run." This tricky refueling operation was first tried on aircraft carriers. It worked but the carrier commanders were understandably reluctant to turn their fighting ships into wayside gas stations. They wanted clear decks for launching airplanes at all times. The Navy, looking around for a substitute, logically turned to its oilers. The switch worked.

Refueling a blimp at sea is an interesting and tricky job. Approaching the oiler, the airship takes a position heading up into the wind at an angle of about 30° to the oiler's course. In this position she is less likely to spill fuel onto the ship's deck's below. Once the blimp is in position, its crew lowers a hoisting line with sandbag attached to the end. The oiler's crew snag the line, removes the sandbag which is covered with a luminous cloth so it can be spotted against the sky and attaches the hose, nozzle-end first. The hose is then pulled up into the airship, the nozzle seated and the signal flashed to commence refueling.

To coordinate the pinpoint navigation of the hovering airship with the action of the oiler's winch and pump operators, a landing signal officer is stationed on the oiler's deck. Several hundred gallons of fuel a minute can be transferred in this manner from the oiler to the hovering blimp.

This new refueling technique, coupled with the fact that the new "N"-type blimps have sleeping quarters for the crew and the engines mounted inside, so they can be worked on in flight, allows lighter-than-air craft, theoretically, today to remain aloft indefinitely.

Improved radar and sonobuoy gear aboard the blimps are powerful weapons in the anti-submarine sweepstakes. These sonobuoys are small, compact radio broadcasting sets, contained in metal tubes about four feet long and as big around as your two fists. Dropped into the sea from the blimp, they bob upright with a whip antenna sticking up in the air. A sensitive microphone extends from the bottom down into the depths of the sea, where it can pick up any engine or propeller sound from a submerged sub.

Another electronic device carried aboard the blimps is known, technically, as MAD, or meaning metallic airborne detector. Although their range is limited, they are particularly effective in locating metal objects within a limited area of their search platform. This device, say Navy experts, can pinpoint submerged underseas craft at considerable depths more accurately than any other equipment now in use.

★★★★★★★★★★★★★★★★★★★★★★★★★★★★

"Why was the passenger using ticket No. 60040 allowed to carry 53 pounds of luggage without excess charges from Washington to Richmond? Luggage is carried free up to 30 pounds, and the limit allowed is 50 pounds."

"We allowed this," the Washington office replied, "because the passenger was a midget and weighed only 48 pounds himself, thus making the total for himself and the baggage only 98 pounds. Since this was less than the average weight of a passenger alone, we did not charge him for excess weight."

Popular Aviation, 1931

"A Kansas turkey flew in here yesterday against a head-wind, made a two-point landing, had nothing but his wings and fuselage, said he came over the TWA route and refueled at Wichita, Amarillo, Albuquerque and Winslow, and he must have, for his tanks sure looked full. He is a good flyer, but I look for him to crack up about Xmas day and, like all good Kansas tourists, he is not going back. Thanks for starting him on his way. I will send you an orange some time."

Will Rogers to friend upon receipt of Christmas turkey.
Popular Aviation, 1934

★★★★★★★★★★★★★★★★★★★★★★★★★★★★

Radar is used mainly today to spot the small-sized snorkel breathing device used by the latest-type subs. This device rides the wives, sucking in air for the sub's engines and crew far below the surface But as the development of the true submersible emerges—the U.S. is expected to have an atom-powered sub in test operation in another two years. It is already under construction at New London, Conn. The airship, capable as it is of carrying tons of underwater detection devices, will become increasingly more important.

The true submersible would neutralize anti-submarine radar, which does not operate below the ocean's surface. It would throw the burden of detection on large craft, like the blimps, which can carry the heavy amounts of electronic gear needed to work sound through the many layers of water.

The atomic-powered submarine will not be the only true submersible which the blimp crews will be called up[on] to [use] bat in the future. There are [many in]cations that the submarine-m[inded] Russian Navy (Russia today is sa[id] to [have] three times as many operation[al] subs a[s] the U.S.) is working hard, w[ith] the [aid] of German scientists, to perfect the Wa[l]ther engine. U.S. submarine t[echnicians] are also working to perfect th[is] power plant.

Very little has been written [about] the Walther engine. In the long r[un] it may prove, however, to be one of the most important inventions in the sub field since the invention of the diesel.

A revolutionary, new-type [engine] it contains its own oxygen supply. It take[s] its name from the German engin[eer] who developed it before World War II. It works this way: hydrogen peroxide [is] broken down into water, in the form [of] steam, and oxygen. These are fed into [a] combustion chamber along with the fu[el] oil. From the combustion chamber steam pressure is directed into the turbine driving the propellers.

With such an engine, a submarine could stay submerged for months, never poking its snorkel, or any other device, above the water where radar could spot it.

In addition to its self-contained oxygen the Walther engine is extremely powerful. Seized German records show the Nazis installed a Walther engine in one of their Type 17 U-boats in late 1944, and achieved a speed of 24 knots submerged with it. This is faster than any of our streamlined "guppy" submarines can go today.

The Walther engine, as far as the Germans had developed it, possessed many faults. It could maintain its maximum rate for less than six hours. After that the engine could not be used again until the sub returned to base for more fuel.

The cost of operation was almost prohibitive. One Navy engineer, at the time the engine was first examined, estimated it would cost more than $100,000 to run it for six hours at a 24-knot-an-hour speed. There is every reason to believe, however, that German technicians, working for the Russians, have overcome many of these early faults.

What may be the problem for future blimp sub-hunters is an underseas craft powered by a combination of three types of engines . . . batteries for slow, underwater operation, a diesel engine for cruising at periscope depth and a Walther engine for high emergency speeds. Different type airborne detection gear would be necessary to detect each type of engine when it was powering the sub.

The Russians also have the German Kreislauf closed-cycle diesel engine which breathes the oxygen from its own exhaust gases, freshened occasionally by injection of pure oxygen from tanks carried in the submarine. It permits deep underwater operation of diesel engines without an outside source of air.

Whichever type of engine emerges as the ultimate power source of the true submersible . . . atomic, Walther, Kreislauf or a combination . . . one thing is certain. The blimp will be a potent and important weapon in the anti-sub battle.

END

CAN YOU SPOT THEM?

The Mail Box

(*Continued from page* 41)

DEAR READERS:

The numbering and designation of Air Force aircraft needs clarification following our reply to H. B. Peterson in the December, 1951 Mail Box.

As simply as possible, here it is. There is one designation, and one number to an airplane. The designation remains relatively constant, the number changes but the change has significance.

Let's take the airplane's designation first. Air Force designations break down into (1) a letter, plus (2) a model number, plus (3) a series letter, plus (4) a block number, plus (5) a manufacturer's identifying code letter.

The letter indicates the type of aircraft —its original design purpose such as bombardment (B), or fighter (F), or Cargo (C), etc.; the model number designates aircraft of a given type which are alike in general configuration, construction, equipment, performance, thus B-47, F-86, C-119; the series letter applies to aircraft of a given design and model which are to all practical purposes interchangeable in parts, and identical in tactical use, thus B-47C, F-86E, C119H; the block number shows modifications in structure, arrangement or additions or deletions to the aircraft's equipment such as B-47A-10, F-86E-1, C-119H-5; and the manufacturer's code letters identify the manufacturer of the airplane (not necessarily the original designer) such as B-47A-10-B0.

For all practical purposes, only the type and model and series legends are in common use.

The numbers on the tail indicate the fiscal year the order for the airplane was placed and the number of aircraft ordered during that year. The first number is the key to the fiscal year; thus the number 8322 would indicate the 322nd airplane ordered in FY1948. Since whole blocks of numbers frequently are cancelled during any fiscal year, the number of an Air Force airplane does not indicate the exact number of aircraft actually delivered.

The Editors.

DELANNE, AGAIN

I've read of several different ways to slow down the lightplane but there's one method I haven't heard much about. A Frenchman named Delanne, I believe, designed a biplane with what looked like extreme stagger. The trailing edge of the forward and upper wing was even with the leading edge of the rearward and lower wing. The gap between the wings was about the same as on a regular biplane.

This set-up amounted to a sort of slot effect, and the speed ratio came out about seven-to-one . . .

ROBERT SMITH

Auburn, Ala.

● *See November, 1950,* FLYING *for a discussion of Delanne's design in the article, "Wanted: A Grasshopper Destroyer" by William S. Friedman and B. Michael Gladych.*—ED

SURPLUS PRICES

The prices in your article, "Know Your Engine" seem quite unreasonable.

Assuming the prices quoted were on a Continental A-65, standard crankshafts, for instance, can be furnished for $25.00.

I have flown my T-craft over 300 hours since last December and the total maintenance cost other than gas and oil (I do my own labor) has been:

New spark plugs at fifty cents each, two landing shock cords at $2.90 per set, two new 6-00-6 4 ply tires at $10.50 each and a new gasket set which cost $2.50. The complete kit of rings, pins, bearings and valves that I have in reserve cost less than $35.00.

The reason for these low prices is that the Air Force has released most of their A-65 engines and parts as surplus material and most dealers are overstocked.

I have devoted much of my time and energy to promoting an interest in flying among my friends and already know three people who have become pilots as a result of my efforts, plus six or eight more who have become interested and started taking lessons.

Any article which quotes factory prices rather than the lower prices available might tend to scare away the "working-man-pilot."

H. C. FRANKE

Oklahoma City, Oklahoma

FLYING CLUB GUIDE?

We have recently organized a club with the intent of learning to fly at a minimum cost to the individual. We have enlisted the services of a competent instructor, and are conducting a ground school prior to flight instruction.

We are, however, in need of some basic rules to use as a guide for controlling the activities of the members. We will appreciate any information as to where we can obtain a set of rules and regulations that have proven satisfactory in the past.

F. W. PARDUE

Pascagoula, Miss.

● *The CAA has published a handy booklet* The Flying Club *which deals with the organization, cost and operations of clubs. Also included are suggested articles of incorporation, by-laws, rules and manual information. It can be obtained from the U.S. Government Printing Office, Washington 25, D. C. for 15 cents.*—ED.

PROMOTER HOADLEY

I am a young minister just learning to fly and I wish to report the kindness, help and wealth of information on flying that your check pilot, Mr. Hoadley has given me.

He is certainly promoting private flying in this section.

C. R. WILLIAMSON

Spencer, Indiana

VHF Equipment

As a result of the reduced fare, a sub-

Hydraulic Fluid Dispenser

NOTES ON CIVIL FLYING

The DC-7

A new transport airplane, faster than any other in airline service, has been announced by American Airlines, Inc. and Douglas Aircraft Company.

Known as the Douglas DC-7, it was designed by engineers of American and Douglas to be the most modern in the transport field, and will represent the best effort of their wealth of transport experience.

The airplane will be 40 inches longer than the well-known DC-6B and will be powered by four Wright turbo compound engines. The compound engine, a new and modern development, is one which utilizes the energy of the exhaust gases to operate three auxiliary turbines, which in turn are geared back to the engine crankshaft. The result is increased horsepower and high fuel economy.

American Airlines is ordering 25 of the new airplanes, which will transport 60 passengers at a cruising speed of more than 360 m.p.h. and will cost approximately $1,590,000 each.

N. Y. 'Copter Service

As further proof that the helicopter age has arrived, we have word that the Civil Aeronautics Board has authorized New York Airways, Inc. to operate helicopter passenger, property and mail service in the New York metropolitan area for a period of five years. The service to be established is designed primarily for expedition of air passengers, express and mail to and from Newark, LaGuardia and International Airports, and development of shorthaul traffic between suburban communities in the New York area.

Since the unique problems that handicap surface transportation in this area result partly from the very high concentration of people and the geographical location, and are further complicated by the existence of many natural barriers such as rivers, harbors and bays, the helicopter should offer immediate as well as long range benefits of substantial degree.

In authorizing the service, the Civil Aeronautics Board feels that consistent with its policy to exercise its developmental powers, it now is utilizing those powers further to foster and encourage the development of a new and rapidly developing mode of transportation, with the New York area as another theater in which to test thoroughly the practicability of this newest vehicle of air transportation. The proposed service has been supported by practically all local government bodies and civic groups in the area and also provides for communication and evacuation facilities in event of atomic warfare.

Passenger service over the shuttle routes between LaGuardia, Newark and International Airports will be permitted immediately, but passenger operations may not be inaugurated over the remaining routes until after at least one year of operational experience in the carriage of mail and property only.

Weather Forever

A new continuous aviation weather broadcast which is now in operation in the New York metropolitan area has been announced by the United States Department of Commerce Weather Bureau.

Although designed primarily to aid private pilots at the many airports in this area by providing weather information most generally used in flight planning, it should also help pilots requiring special information by relieving our forecasters at LaGuardia from many routine briefing discussions, thus enabling them to devote more of their time to individualized problems.

Most important of all is the fact that it provides essential weather information to many pilots who have found it difficult, especially during times of marginal weather, to obtain service because of the "busy telephone" problem at the Weather Bureau Office.

The broadcast has been on the air since November 1, 1951, with receivers installed at 15 local airports to date. Benefits resulting from this program should continue to increase as more pilots operating in the New York area learn of and use the new service.

Milestone for Beech

The 3,000th Beechcraft *Bonanza* to roll off the production lines was delivered recently to the Wean Engineering Company of Warren, Ohio.

The new *Bonanza*, along with another *Bonanza* and a Beechcraft Model 18, will be used by executive and engineering personnel to maintain a tight and active travel schedule throughout the Northeastern part of the country principally from Chicago east to the Atlantic.

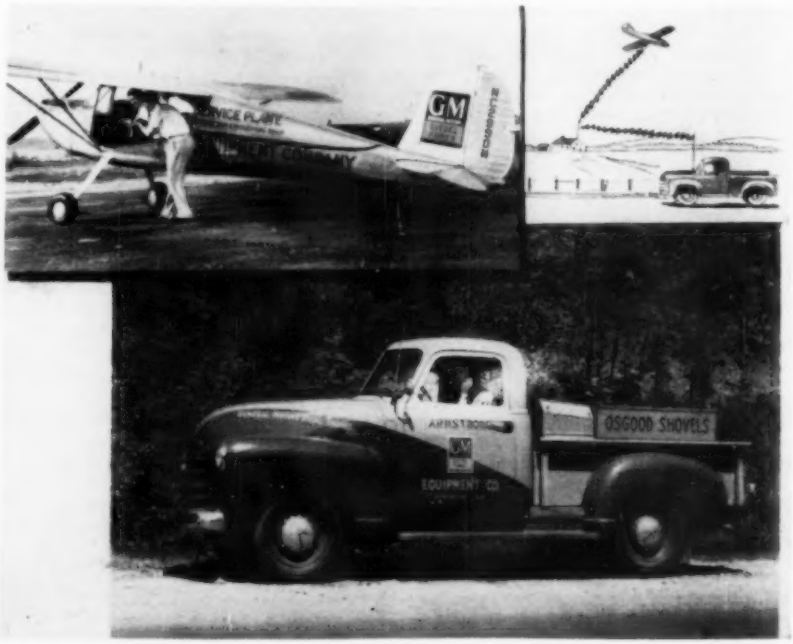
Plane Utilization

Word comes from Birmingham, Alabama that airplane transportation plus radio-telephone communications have been combined to speed service on Diesel equipment in that vicinity. Vital operations are maintained in spite of minor or often major interruptions by a service truck and a two-place plane, each equipped with a radio phone, belonging to the Armstrong Equipment Company, GM Diesel Engine Distributors for Birmingham.

For one example of the versatility of this combination we have the story of a contractor 131 miles away from Birmingham who recently reported a minor engine difficulty which was holding up his work. He met the plane at a nearby airport, arriving there just as the plane taxied up the runway. The contractor was back at work two hours after calling for service.

The plane, a Cessna 140, can carry 80 pounds of spare parts plus two passengers. Armstrong's truck carries a complete set of hand tools as well as a good stock of spare parts, enough to give an engine a minor overhaul in the field.

Since Diesel engines are relied upon for vital power supply in this area, fast service is essential. This alert organization utilizes the latest in communications and transportation to do an outstanding job.



New VHF Equipment

A new communications system has been developed by Lear Inc., combining in one compact unit designated the LTRA-6, a VHF receiver, VHF transmitter, and low frequency receiver incorporating many features and refinements of particular interest to the executive and itinerant aircraft pilot.

The tuning section of the VHF receiver embodies the most recent engineering advances in both circuitry and mechanical design. A rugged, highly stable inductive

tuning unit is used in conjunction with a specially engineered oscillating circuit to provide greatly increased accuracy and stability of calibration. The R.F. amplifier utilizes a recently released 6BK7 tube in a circuit designed to provide the ultimate in low-noise, high-sensitivity performance, bringing in weak signals with considerably enhanced effectiveness. Ignition disturbances are suppressed by a newly designed noise limiter circuit.

Both the VHF receiver and the low frequency receiver components feature illuminated, easy-to-read, slide-rule type dials, set at an angle to provide optimum visibility to the pilot.

BOAC's Connies

New economy and comfort will be afforded passengers who travel tourist class on the British Overseas Airways Corporation, according to latest details we have just received regarding modifications to the aircraft in which trans-Atlantic passengers will be accommodated.

Negotiations have been completed with Lockheed Aircraft Service Corp. to completely modernize five *Constellation* aircraft for this purpose. The interiors will be completely redesigned and redecorated, and a number of modifications to improve the comfort of the aircraft for passengers will also be incorporated. The result will be a virtually new airplane.

The BOAC *Constellations* will have flexible density seating to make them adaptable for first-class services and special charters in addition to tourist travel. All passengers up to a maximum of 68 without regard to the type of service on which they are travelling will be accommodated in fully reclining seats without any reduction in leg room. When used on services other than tourist, the fourteen aisle seats can be removed in a matter of minutes. Also, the first six rows of seats can be folded against the sides of the fuselage to permit the carriage of cargo. Another important feature incorporated in the modification of the aircraft is the installation of a completely new air conditioning and pressurization system.

As a result of the reduced fare, a substantial increase of tourist traffic is expected, thus increasing BOAC's dollar earning capacity. The modification of these aircraft will permit BOAC to offer some four hundred tourist seats across the Atlantic weekly, in addition to its regular first-class services.

Walkie-Talkie

Passengers will be getting more accurate and up-to-the-minute information concerning trip operations and repairs also will be speeded up, with the installation of a Motorola walkie-talkie system at Capital Airlines' headquarters in Washington, D. C.

A mechanic working on a plane on the

ramp outside the company's hangars relays the latest information and time of readiness of the plane to the flight dispatch office. This information is immediately turned over to the ticket agent who is able to relay to the passengers a constant flow of current news.

In addition to this service, messages can be sent by the mechanic to the maintenance crew chief's office for needed parts which are immediately dispatched to him, thus speeding up delivery of parts from the hangar store rooms to the plane under repair and readying it sooner for passenger loading.

The new hook-up consists of a permanent installation on the wide ramp, a desk

set in the flight dispatch office and another of the same in the maintenance crew chief's office. In addition, there are two mobile hand sets for use by the mechanics when making adjustments inside the plane.

Hydraulic Fluid Dispenser

A standard 5-gallon GI can, equipped with pump and several filters, has been transformed into a time-saving hydraulic fluid dispenser by Mid-Continent Airlines' engineering department. The gadget also virtually eliminates the possibility of hydraulic fluid contamination because of its efficient filtering system.

Designed especially to replenish the fluid supply in the pressurization system of Convairs, the dispenser also has replaced the gallon can formerly used to refill the hydraulic system on Douglas CD-3s and has become standard equipment on the company's servicing trucks.

Another item not to be overlooked is elimination of spillage on aircraft floors which nearly always occurred when a can was used for refilling, particularly on DC-3s.

VHF Radio-Telephone

National Aeronautical Corporation has announced a new ground VHF radiotelephone station for fixed base operators and small airlines. List price is $450.

Deferment for Dusters

Agricultural flying has been placed by the Labor Department on the list of critical occupations in the defense effort, and pilots so engaged will receive consideration for deferment by draft boards and in recall to military service.

The action by the Labor Department follows recommendations of an Inter Agency Advisory Committee which advised Maurice J. Tobin, Secretary of Labor, that dusting, seeding, weeding and defoliating of crops and forest, pest and fire control by aerial applicators was an essential and important part of defense preparations.

The Committee received evidence from the National Aviation Trades Association which had conducted a survey revealing that 61% of the pilots in agricultural flying were subject to draft or military recall. The Civil Aeronautics Administration collaborated in the survey and testified that the use of the airplane in agriculture is growing fast and assuming more importance all over the world in the production of food and fiber crops.

New Book

A valuable book for airport managers has recently been produced by the International Steel Company, Evansville, Indiana.

International is a major supplier of steel aviation buildings and custom-designed hangar doors. It has made available to the aviation industry this book entitled "This Is International Steel."

Included in the book are photographs and descriptions of several typical airport installations throughout the country, showing how steel buildings can be arranged to solve the housing problem that most airports face. Other pages present some of the large hangar doors that International has designed and built.

In addition to serving the aviation industry, International also specializes in steel fabrication, farm buildings, structural steel, revolving doors, industrial doors, and many other metal products.

The International book is unique in that it is a comprehensive story of the facilities of a large organization without a single picture of a company officer, director or other executive personnel. It was designed solely as a working tool for International's customers.

Landing System

(*Continued from page 25*)

"dangerous experiment," the pilots marched in body to the commanding officer in protest. As a result we were allowed to continue the X-Plan on an emergency basis only.

Later on the X-Plan was installed at the 11th Air Force Instrument School. All pilots assigned to fly the Aleutian area were instructed in this emergency landing system and we were able to bring home 5 aircraft which otherwise would have been lost. In one case, with the base completely "socked in," we elected to position one fighter over the center of the Island and gave the pilot bail-out instructions. His P-40 crashed into the ocean, but the pilot came down into the arms of an alerted MP at the Navy Base.

Under Lieutenant McClure's direction, the Direction Finder crews became astoundingly accurate. After electronic scopes were installed at their antennas, the operators were able to track aircraft within an azmuth error of only ½ of 1 degree. Further proof of their skill occurred when one P-40 pilot complained that he was guided to the left side of a 50-foot wide runway instead of to the center of the strip.

After more modern radar and blind landing equipment became available, the X-Plan died a natural death. Its main disadvantage was that it made no provision for altitude determination. But this "bailing wire" landing system has saved the lives of some 30 men.

The fact that the X-Plan actually worked has been a never ending source of amazement for me. Yet the fact that it did work is a real tribute to Captain Pope, Lieutenant McClure and all the others who contributed to its success. These men, in effect, created something from nothing—they recognized a critical need and did something about it without fear of being criticized. This was the pioneer spirit that added a new chapter in the history of man's fight against the weather. END

I Learned About . . .

(*Continued from page 38*)

But mountain elevations, range names, locations and names of the smaller communities are often highly inaccurate.

Shortly after taking up the heading, I became aware of a seeming discrepancy. We appeared to be nearer a southwest, rather than a south course. However, I mistrusted my sense of direction in any disagreement between it and the compass. I did, nevertheless, check with a pocket compass I always carry. And it bore out my impression of being on a southwest course. But I had no idea of how much deviation might be affecting the pocket instrument. So I stuck to our heading with only a slight correction to the left. Almost immediately I began to wonder what effect, if any, the five-gallon jerry-can may have on the compass.

I analyzed the situation carefully. We had plenty of gasoline; and the weather was ideal. We could continue on the present heading in the hope—which was based on a reasonable expectation—that we could pick up an identifiable landmark just short of our destination. Or, swing a few degrees to the left towards the River Yaqui which paralleled our course some miles to the east, then follow it south. I suspected, though, that the Yaqui might be dry this far north, and could easily be passed over without being aware of the fact. So I decided that to continue on the present heading until our ETA came up might perhaps be the wiser policy. If we couldn't identify our position by then, we could as a last resort turn west and come out into familiar country and, eventually, the coast.

Thirty minutes past our ETA, with absolutely nothing in the terrain below familiar to my passenger, or corresponding to the chart, I decided to turn west.

"I'm getting so I dread these impulsive cross-country hops!"

What I didn't realize in depending on my passenger for even slight assistance was the fact that his eyesight was so poor he couldn't have recognized New York City from on top the Empire State building. At times I was reminded of the legendary will-o'-the-wisp. He'd see a pile of colored rock which he would mistake for a town, and say:

"Isn't that a town? Circle it, and let me take a look. Maybe I can recognize it."

Before he'd venture an opinion as to whether the object looked familiar or not, he'd sight something else, and yell: "By golly, there is a mountain (or town, or dry river). Let's go over and take a look at it."

On one occasion, we scooted over to look at an adobe village which he thought might be Tecoripa. After circling it, he said it might be Nacori. But 30 seconds later the guess was Metape. I gave up in disgust after a number of these fruitless jaunts; and without bothering to mention the fact, headed west. We came out near Guaymas, on the coast; and I thought we may as well go on in and gas up. When we were near enough to almost throw a rock into the ocean, my passenger leaned forward suddenly, and exclaimed: "Hell and damnation, isn't that a river up ahead?"

I snorted; but was too provoked to answer. We landed amid his muttering about such a devious route to Bacanora.

From Guaymas it was a relatively simple matter to fly due east to the River Yaqui which at that point, and for the next several miles downstream to the ocean, is a large and easily identifiable river. On picking it up, we turned north; and in a short time were near various landmarks—all of which were within sight of our destination.

I was almost consumed with curiosity as I watched the compass when I lifted out the gas can while unloading at the airstrip. And, lo and behold! It jerked suddenly, oscillated for a few seconds, and then settled on a heading 7° from what it had been before the can was removed. Possibly the error was even greater while in flying position and with cruising power.

The moral in this little anecdote—assuming that there is one? Well, draw your own conclusions. END

There's more to a job at Lockheed than eight hours' work a day. There's the friendly spirit of progress—of getting things done—that makes work so much more stimulating. There's the better life you live—just because you live in Southern California. There's the future that offers you and your family security and advancement with the *leader in aviation.*

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in a better place to live

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Outdoor life prevails in Southern California the year around

Special training courses prepare you for promotion

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Better Living Conditions

Every day, you get a "bonus" at Lockheed—in the better living conditions. The climate is beyond compare. Recreational opportunities are unlimited. Golf, fishing, the patio life at home can be yours 12 months a year. And your high Lockheed salary enables you to take full advantage of the climate and recreational opportunities.

Better Future

You have a *future* at Lockheed—not just a job. For Lockheed is building planes for defense, planes for the world's airlines. The planes of tomorrow are being designed today in Lockheed's long-range development program.

Special training courses in management and various phases of aeronautical engineering help prepare you for the future and promotion. Ask any of the 5,000 who wear 10-year pins whether or not there's a career and security at Lockheed.

To Engineers with Families:

Housing conditions are excellent in the Los Angeles area. More than 35,000 rental units are available in the Los Angeles area. Huge tracts for home ownership are under construction now. Thousands of homes have been built since the last war. Lockheed counselors help you get settled.

Educational facilities also are excellent. The school system offers your children as fine an education as can be obtained anywhere. Elementary and high schools are conveniently located. Junior colleges and major universities abound. 21 are in the Los Angeles area.

Lockheed also offers you:

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Lockheed will train you to be an aircraft engineer. Full pay while training.
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Flight Manuals Engineers
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Takes A Tour

(*Continued from page 29*)

most satisfactory. And that within that 60 miles, it is best to pick out 12 points of interest.

After the Delaware County route was agreed on, three preview flights were made within the two weeks prior to the tour. For these flights Pilot Dick Burwell flew a Cessna 140, carrying radio and press personnel on one of the flights for publicity purposes and briefing the pilots with extra-small-detail maps on the others.

The Cessna 140 is supplied by the Aviation Board for these preview flights. For the preview flights for other tours, however, the Standard Oil Company has been generous in providing its Lockheed *Lodestar* and pilots.

The Aviation Board was also responsible for rounding up aerial farming demonstrations for tour day, producing maps for the tour booklets, and for taking photographs of areas to be marked as points of interest. To that end, the Board provides, free of charge, its aerial camera, photographer, plane, and pilot, asking only that the sponsors pay the cost of film and developing.

As the day for the tour drew near, Operator Florance, whose airport was chosen for its ease of accessibility, insurance coverage, and public facilities, was struggling to set up display areas for static exhibits, outlining the loading area, helping to map the course, and discussing best possible flight altitudes.

Meanwhile, the other members of the tour committee were preparing a program booklet to be distributed on the day of the tour; having tickets printed; and assembling notes for the passenger briefing to be done every hour in 15-minute talks by Paul Cunningham and Geralt Solt.

The publicity committee had contacted all the local granges, lodges, and clubs. It tacked up posters developed from aerial photographs. And it supplied information to the *Gazette* and all other county papers for a series of articles beginning three weeks before the tour. It might well be pointed out that even though the tour's theme was essentially rural, County Agent Paul Cunningham sent a specific invitation in the *Gazette* to the people of Delaware City.

Tickets, for sale at $3.00 per flight, were printed and distributed by the Extension, the Chamber of Commerce, District Banks, and the *Gazette*. Selling them in advance is good publicity, says the Aviation Board. And the Board has found that the seller should ask each buyer what time he plans to be at the field. Such information can smooth operational procedure on the day of the tour, as can selling tickets in groups of three.

Farms were marked in lime with numbers 15 feet high. A heavy small number proved better than a tall, thin one, for pilot and passengers need not read the number until they are over it, yet the pilot should be able to see the thick white spot for miles. The farmers whose land was numbered as an example of good land-use practice literally stormed the airport on the day of the tour and took each and every member of their families over the route at least once.

All costs for these first moves—the printing of tickets, tour booklets, and posters—were met by the Kiwanis Club, Chamber of Commerce, and the local banks. For such community-conscious organizations can see what the air tour contributes to the county's welfare in both short- and long-range terms.

With the day of the air tour almost at hand, one of the final details to be checked was insurance. Each owner had the necessary insurance on his plane and Florance had public liability insurance. Had there not been, there is a special one-day policy available for $50.00 that covers all participants regardless of number.

And There I Was . . .

GCA operators have serious work to do, and ordinarily there is little comedy relief in their daily routine. A story from Norfolk Naval Air Station provides one exception to the general rule:

Seems that eight planes from a carrier squadron were scheduled for a routine night stacking exercise. This involved their taxiing out to the duty runway, checking in with the tower by radio and being assigned a VHF frequency, then taking off to climb to assigned altitude at designated holding points and begin making routine ground controlled approaches, as directed.

An additional plane, piloted by a man new to the same carrier squadron, was scheduled for the same time. Mission: A night familiarization hop for the pilot. He knew very little about the plane, and less about the local area.

The tower duly noted eight planes taxiing out. All were assigned frequencies and altitudes, all took off and proceeded to designated holding points. GCA took over and the approaches began.

GCA had not been told about the ninth plane's being scheduled, nor were they aware of the fact that one of the original eight for night stack had not left the squadron line due to mag trouble. It was somewhat disconcerting, therefore, to the operators, after all eight planes in the air had made three good passes each, to hear one call:

"Look, fellas—I don't know how I got on this merry-go-round, but how about letting me off so I can go out on my night fam hop?"—*Lieut. Comdr. George Cornelius, USN.*

Such policies are written by the Henry Holland Insurance Co. of Buffalo, N. Y., and the Ohio Casualty Co. of Hamilton, Ohio.

On the day of the tour, the weather was typical cold air mass type with cumulus clouds and moderate turbulence. Shortly after 9:00 A.M., the first group of passengers assembled in the main hangar. As they bought tickets, they were placed in groups of three and given a "flight number." Paul Cunningham then briefed them on the purpose of the tour. He told them also what they would see, and showed them on huge aerial photographs how to recognize it. After the briefing, the groups were called to the waiting planes over a loud speaker system.

Since one of the first questions asked at any tour is, "How do I know where I am in the air?" both pilots and passengers were briefed with great care. For the pilot is the only one who can answer questions about the purpose of the tour, about "that bare patch down there," and about the airplane as an industrial and agricultural instrument. The passenger is the one who will walk away from the tour a confirmed salesman of aviation if he is briefed intelligently before and during his flight.

As for the flight itself, Florance says, "Generally speaking, everything went well. I made every effort to reassure the passengers of their safety and was also continually pointing out points of interest to keep them occupied. So, even though this was the first flight for the majority of the riders, I had no trouble."

The *Gazette* opened its air tour story as follows: "By noon today more than twice as many people as last year had taken the conservation district air tour. More than 100 had taken the flights by noon. The total last year was 212 for the entire day." The final total of pay passengers reached 240 and would have gone much higher if rain hadn't interfered.

But those who made the trip—many of them over 70 years of age, some of them less than six—saw in a dramatic fashion how good strip farming and reforestation had kept much of Delaware County richly green despite the summer's drought. They saw with remarkable clarity how and why Ohio's six-year-old state conservation plan had been successful.

Despite the turbulence in the air, the on-the-ground program continued at full speed. At 1:00 P.M., the State Highway Patrol gave a demonstration and at 2:00 P.M., there was an airplane crop dusting demonstration. Such demonstrations, as well as CAA movies, farm machinery exhibits, and model airplane contests have always helped pull in the crowd. Then, curiosity will often get such visitors to take the tour.

As darkness fell, the last plane dropped in with its load of passengers, and Paul Cunningham and John Florance added up the score. Between 80 and 90 per cent of the passengers had been non-flyers. Their reaction was: "I never really saw my farm before," or, "That was the most exciting trip I ever took."

It is good business then to hold a community air tour. And it's long-term good business, too. For satisfied customers tell their friends who often hire a plane to fly over their own farms. Other customers return just to take a ride. And Florance says that at least one farmer started flying at his air port after this year's tour.

But there's a much greater gain in the community air tour. Florance calls it, "an intangible gain." He means the gain that comes to everyone in aviation when the public sees the airplane as an efficient tool.

END

LOGGING TIME

WITH HY SHERIDAN

Captain, American Airlines

TRY, TRY AGAIN

An engine failed in the storm and caught on fire; the hydraulic lines caught on fire also. One of the other engines was drowned out by the heavy rain and the remaining two engines would not develop full power. The pilot could hardly see anything through his windshield for it was just as if, because of their high speed, a fire hose was played on the glass. He got the airliner down though, with minor damage to it and none to the passengers.

At a meeting of the officials the Operations Manager stood up and said: "Gentlemen, we cannot give the pilot a citation for his work that night. I hear on good authority that he did not have his jacket buttoned."

* * *

BLACK CAT THEORY

I am a bit superstitious, says a pilot by the name of Jones. If the nose wheel collapses and the airplane goes down the runway like a flight engineer down a hotel hallway, it is a sign of bad luck.

When the integral gas tanks spray a trail of gasoline along the runway but the ship does not catch fire, it is a sign of good luck.

CONCLUSION: It is good luck if the bad luck is not so bad as it could be if you had bad luck. Seeeeee?

* * *

THE UNKNOWN QUANTITY

The airliner had to wait for a slow airplane ahead of him to land. A bulgeous babe of some self-importance asked Sadie the Stewardess, "Just what is our pilot doing?"

"A figure S, madam," Sadie replied.

"Well, I guess that's all right, but you tell him not to try any of those X's."

Motto on parachute pack: Heaven Can Wait.

* * *

PIPE DREAMS

"You have only 25 per cent braking on wet runways, tests have shown. Therefore, we will cut down your loads under such conditions."—Operations Manager.

* * *

JET-PROPELLED SWIVEL

Well, I see by the papers that there will be no more flight pay for officers who sit in swivel chairs and don't regularly go up in airplanes. They don't get paid for flying a swivel chair no more. This hardly seems fair. What about those flights of fancy?

THE IRISH HAVE A NAME FOR IT

There was aboard my DC-6 a famous Irish author and playwright, a fellow who has wrought many famous plays, and we got to talking about an old-time airline pilot who was as wild as the early worm and renowned for his escapades. "He was completely off his cobb," the Irishman said, perhaps in envy.

"Oh," I replied, "all of us in this business are a little abnormal."

"Yes," he objected, "but he was more abnormal than is normal."

* * *

TACTICS

No one can say that the American Army is not resourceful when it comes to tactics. In Korea, the Reds began taking pot shots at our generals, but our high command had an answer for that. They ordered our generals to take off the pots.

* * *

LIVING AND LEARNING

You know the old slogan: Live and learn. Well, if you don't live, you don't learn, as our college draftees are discovering. And, our auto traffic being what it is, if you don't learn you don't live. Anyway, what you don't know, the Air Force is prepared to teach you, according to their advertisement in a recent issue of POPULAR MECHANICS, which asks young men to join up and become Flight Engineers.

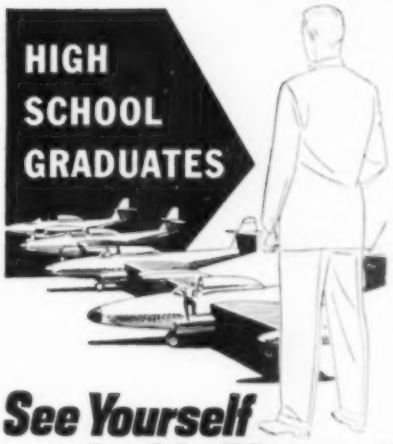
The picture accompanying shows a Flight Engineer sitting at his control panel, "Ready for take-off . . ." The fuel is shut off and the engines are cold and dead, according to the indications of the instruments. Just in case you might have missed that, the words below the picture say: "The flight engineer of a USAF B-29 . . . waiting the pilot's signal to return props to high pitch for take-off after engine run-up." To high pitch, surely.

Well, I guess they are right. They will teach you anything in the Air Force.

* * *

EPITAPH

Well, here lies Willie who was quite a kid;
He did lots of things that he shouldn't of did
And he didn't do the things that he ought to of,
So Willie's not around but way up above.



See Yourself in this Picture!

TRAIN FOR AVIATION AT *Northrop*

Join the hundreds of career-minded high school graduates now training at Northrop Aeronautical Institute. Qualify yourself for an important, high-paying job in the vital, essential aviation industry!

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2. At Northrop your training is thorough, practical, complete. You work with advanced training equipment—live jet engines, wind tunnel, scientific test equipment, single and multi-engine aircraft.

3. Northrop training prepares you for *essential work;* after you enroll at Northrop Aeronautical Institute, the registrar will, at the proper time, notify Selective Service of your student status.

4. When you complete the Northrop Aeronautical Engineering course, you are educationally qualified for Air Force Cadet, Officer Candidate, or Naval Aviation Cadet.

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505

You Can Survive

(*Continued from page 34*)

near side of peak.

"Drifting into peak at 180 degrees. Into valley and could not hold altitude. Cowling blanketed with frozen snow. Flew with window open for visibility. Tried to head down valley 100 feet over tree tops.

"Going well until downdraft sucked us into bottom of valley meadow. Landed in about five feet of snow. Nosed over on prop in small ravine and settled back on tail. Neither Bob nor I hurt.

"Time of crash-landing 8 A. M. Stayed with plane. Time now 12 noon. Waiting for blizzard to subside. According to airspeed indicator wind is doing up to 40 miles per hour in gusts. Steady at 30 miles per hour."

That was the last entry in Dr. Button's log. It shows that he knew generally where he was. It also shows—and this is important—that the men did not panic. But, if you read between the lines, you can see two fatal mistakes.

The doctor knew he was reasonably close to Creede, Colorado. Whether or not he realized it, he was within five miles of two completely furnished cabins.

But he also believed he would have to walk out, because he knew no one would come in after them in time. He was certain of that, because he had not filed a flight plan. *That was his first mistake.*

The doctor was wearing an ordinary suit of clothes, an ordinary overcoat, an ordinary pair of oxfords. That's not the kind of clothing most suitable for a trek through five feet of snow in a blizzard.

But the doctor started out anyway. When he failed to return, Eakes tried to walk out. His body was found seated between two trees, as though he had stopped to rest.

And back at the virtually undamaged airplane both men had deserted there was a half tank of gasoline. There was oil. A few hundred yards away there was thick timber—timber for fuel, branches for shelter. In overnight bags inside the plane were articles of clothing that could have been soaked in the gasoline—a torch to spark the fire that might have saved their lives.

Inside the wings were control cables that could have come out and been used for shelter support wires, timber pulling wires, or perhaps a snare line had they needed it.

So both men tried to walk out; both elected to choose the path in insurmountable odds in their fight for life, while back at the airplane lay the very things they needed—life, warmth, shelter, an even chance to survive.

So that's where the doctor and his passenger made their second fatal mistake. No, they did not succumb to panic for they calmly sat for more than four hours waiting for the storm to let up.

The thing that killed them is that they apparently failed to recognize or appreciate the real danger they were in—the killing power of cold and drifting snow. And if they did recognize it, they did nothing about it.

They said, "We'll wait for the storm to quit. If it doesn't, we'll walk out anyway."

They should have said, "Dressed as we are, our chances of walking out of here are poor. Our only alternative is to stay here, perhaps a day, perhaps a week. The greatest potential danger to our safety is the cold. We will therefore expend our energy in gathering firewood and building some sort of a shelter. It will be uncomfortable, but it will keep us from freezing, and if we stay warm and dry and do not exhaust ourselves, we stand a better chance of surviving here than we do if we try to walk out."

So right there—in the ability to recognize what, in any particular situation, is most likely to kill you, and then do something about it immediately—you have the difference between almost certain death and an even chance for survival.

If you fly the iron compass, or stick close by the highway, or cover only the relatively flat, heavily populated parts of the country, then survival if you should have a forced landing is not much of a problem.

BUT . . .

The day you decide to cross a mountain range, or save 250 miles by going over arid desert terrain, you had better be prepared to live off the land and your own wits.

There is a lesson to be learned from the tragedy of Dr. Button and Mr. Eakes, and it centers in these few rather simple but extremely important rules:

1. On any cross country trip, no matter how long or short, *always* file a flight plan. It can easily mean the difference, Mr. Pilot, between whether you live or die.

2. If forced down, and your airplane is damaged, stay away from it until the engine has cooled and the danger of fire has passed.

3. Check for injuries. It's a great help psychologically to discover you're in one piece. Treat cuts or bruises immediately, especially in hot desert country where danger from infection is greatest.

4. Relax. Take stock of your situation. Calmly plan a sensible course of action. Work deliberately. Don't overexert.

5. Prepare a shelter to protect yourself from rain, sun, cold or insects.

6. Check your airplane, your luggage, yourself. See what equipment you have to live with.

7. Unless you *definitely know* you are within easy walking distance of habitation, stay with, or near, the airplane until help arrives, or *until you've made proper preparations for travel!*

And if you're still interested in staying alive, you might want to remember these few points:

Do first things first. In winter, your biggest problem will be exposure to cold. Do something about it *immediately*. Don't overexert. Work slowly, but *make every move count*. Don't get chilled, and avoid sweating because it leads to freezing. Take off any excess clothing while you work, put it back on when you stop. Above all, keep your hands and feet dry.

The first, and most important job, is to gather fuel for a fire so you can keep warm and dried-out. Once you're sure of your fire, then work on your shelter.

If you're down in a valley, get out of it. Camp well up on valley slopes—it's less

(*Continued on page 54*)

☆ FLAT SPINS ☆

Who needs a parachute? says Margaret Harrison. She fell 40 feet from an airport control tower at Montgomery, Ala., and wasn't hurt.

Ten years from now man-made satellites will circle the earth at a height of 300 miles. So says Lieut. Comdr. Durant, a leading British scientist. He also predicts that in 25 years rocket ships will be able to fly around the moon and return.

So now Thomas E. Dewey is a paratrooper. But it turns out that this is not the Governor of New York State, but a 19-year-old fellow from Niagara Falls.

Didja know? The new B-36 bombers can carry 84,000 lbs. of bombs . . . that's equal to the weight of about 26 autos.

Mrs. Joseph Wullich of Oklahoma City, wishes the man who left an airplane in her backyard the other day would please come and take it away. The pilot walked away, Mrs. Wullich complained, without so much as a "good morning."

Daring parachutist required for private continental mission. Experience essential in night drops, small target area. So breathlessly declared an ad in *The London Times*. But the paper took some of its news page space to explain that this was no cloak-and-dagger plot in the making. The advertiser was giving a Christmas party in Switzerland and just wanted to have a modern-day Santa Claus drop in.

Igor I. Sikorsky, renowned plane designer, once was forced to crash land his plane—because of mosquitoes. They got into the carburetor and stopped the motor. This happened back in 1911 in Russia.

Observation of *The Salem News:* A little faster and a jet pilot can outspeed the rotation of the earth. Thus, if he misses an appointment yesterday, he can still be on time.

Wanna see rainbows in the shape of complete circles? Well, hop yourself up in a plane at the tail-end of a shower. Rainbows can't be seen in circles from the ground, but they can be from planes.

The Air Force is buying a new one-piece flying boot. How come? To give pilots more pedal foot sensitivity.

The still-rugged individualists dept.: When their plane crashed, two London newspaper photographers climbed from the wreckage and began clicking away with their cameras.

—*Harold Helfer*

Do You Remember...?

By BILL BULLOCK

THE 1935 Thompson Trophy Race had drawn thousands of spectators to the National Air Races at Cleveland Municipal Airport, and as the excited crowds sat watching the golden-colored ship flown by Roscoe Turner go roaring past the stands, everyone figured that the colorful winner of the 1934 Thompson Race was wrapping up another victory. He had lapped every contestant and was easily the winner when old lady luck gave him the double cross.

Black smoke and hot oil began to pour from the engine and back into the open cockpit. The crowd moaned, Turner was out of the race.

Half-blinded by the smoke and hot oil, and with a crippled airplane under him, Turner was in trouble. A quick glance ahead and he could see nothing but huge crowds of spectators all over the place. He couldn't bail out and have a wild airplane go tearing into those people. Quickly, he zoomed the ship up high, cut the switch and headed in toward the runway. Roscoe Turner landed that hot-racing plane dead stick, and did a beautiful job of it.

Later that day when he spoke over the loudspeaker, he didn't even mention losing the race due to engine failure, he simply said that he was lucky to be alive, and that was enough for him.

Roscoe Turner had lost the race, but when he had finished speaking there was long and loud applause. The fans love a good sport, and that day they really loved the oil-smeared fellow that had smiled when he spoke to them.

Back in those days Turner was the real playboy of aviation. His powder blue uniforms, waxed mustache, and healthy-looking lion cub that he carried for a mascot made him stand out in any crowd.

Turner, the only man to win the Thompson Trophy race three times, has retired from active participation in the races, but each year when the National Air Races get under way you will find him on hand, for he still takes an active interest, serving as a member of the contest board, and as an honorary judge.

Today, Roscoe Turner is actively associated with the Roscoe Turner Aeronautical Corporation, and is Beechcraft distributor in Indianapolis. He still manages to get in a few hours flying time every month, mostly in heavy twin-engined airplanes.

To the many thousands that knew him as a top racing pilot and the guy with the infectious smile and the waxed mustache, he will always be the fellow that was such a good sport about losing a race.

ROSCOE TURNER AND GILMORE

Captain P. V. H. Weems, U. S. Navy, Retired, founder of Weems System of Navigation, author, internationally known consultant on air and sea navigation.

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You Can Survive

(*Continued from page* 52)

cold there than on the valley floor—but stay away from the bases of slopes or cliffs where snow may drift heavily, and from ridges where overhanging snow may fall down. Camp in timber if at all possible, for it furnishes both shelter and fuel with a minimum of effort on your part.

When you have fire and shelter, relax and do nothing. *Don't exhaust yourself.* Sleep all you want, and don't worry about freezing to death while you sleep. Contrary to popular belief, you will always wake up when you get too cold *unless you are completely exhausted.*

If you are down in desert terrain, keep your head and the back of your neck covered and get into the shade right away to reduce sweating and loss of body water. Even if you have water, don't drink any for twenty-four hours. Any water you drink after that will be used more economically by your body.

Unless you know definitely that you can reach water quickly and easily, it is best to stay with the airplane. Stay in its shade. If you've filed a flight plan, you don't have too much to worry about.

Wear sun glasses if you have them. If not, improvise by cutting two slits in a piece of cloth and tying it over your eyes.

How about signals? Do something about them, but *only* after you have taken care of your personal well-being. Fire is probably your best bet, if you are down in an area where timber or brush is readily available.

Stack up fuel for three fires in a triangle, each fire about 100 feet apart. Have them made and ready for lighting the moment you hear any airplane engines overhead. Use smoke fires by day, bright flames by night. Add engine oil, rags soaked in oil, or pieces of rubber (matting, tire slices, electrical insulation) to make black smoke; add green leaves, moss or a little water to send up billows of white smoke.

If you're down in desert country, you might lack fuel. You can make a good improvised flare by filling a can with sand soaked in gasoline. Be careful when you light it. Add oil and pieces of rubber to make dense smoke for daytime signal. Use gasoline alone for bright flame at night.

If you're in snow, tramp out a big SOS and line it with tree branches, if possible, for easy identification from the air. Use your engine cowling as a reflector signal.

In all cases, stay with your airplane unless you *know definitely* that you can walk out. It is a veritable factory, a production center that affords you all sorts of life saving facilities. And it is easier to see from the air than you are.

There are a few things it won't give you, though, and if you're flying over relatively uninhabited terrain, it's best to always carry these few pieces of extra equipment:

A TIN CAN—No. 10 (gallon) size—with a wire bale.

A CANDLE; use one match to light the candle, use the candle to light the fire (especially helpful when tinder is wet).

MATCHES—be sure they're in a watertight container.

TOUGH STRING (roll).

LIGHT ROPE (6-8 feet).

JACK KNIFE, preferably with bottle-opener, punch, etc.

A CANTEEN OF WATER.

With the exception of the canteen, everything will pack nicely into the No. 10 can.

So, Mr. Pilot, you're forced down. So what? You can certainly survive as long as you don't panic; as long as you recognize the element in your particular situation that will kill you, and then *do something about it.*

And above all, don't forget to file your flight plan. END

Aviation Education

(*Continued from page* 19)

gage, to tell time in making up flight schedules, to make change when selling tickets.

Reading assignments were no longer a task when related to the subject which had captured the children's imagination. Without prompting, these second graders began scanning the news columns of local papers in search of aviation stories. Incidentally, of course, their reading skills increased as they began to read other types of news articles.

The children also developed social skills in "grown-up" situations. Their frequent trips to the airport, their familiarity with things of importance in the adult world and their experience in cooperative group projects gave them a poise unusual in children so young. Both their mastery of the three "R's" and their social development was natural and painless—a direct result of the challenging subject used as a teaching tool.

Such examples prove that an understanding of the importance of aviation to general education is indeed growing. The subject has come a long way since its introduction to professional colleges of engineering in the early years of the Twentieth Century. Until World War II, its history is that of slow and gradual expansion. Trade schools were the first step in aviation's gradual filtering down to the primary grades. As far back as 1925, Cass Technical High School in Detroit changed its course in aircraft model building into a technical study, with emphasis on airplane construction, engine maintenance and aerodynamics. In the same year, the Galt High School in California offered a course in aeronautical science and actual flight training—the first high school to take so bold a step.

In the late 1920's, a questionnaire sent to 2,970 major school systems by the Daniel Guggenheim Fund Committee revealed that 300 schools (ten per cent of those queried) had introduced aeronautical studies, although only 50 reported actual vocational courses. Throughout the next decade, the Guggenheim Fund Committee on elementary and secondary aeronautical education gave the movement its greatest impetus. To the Committee's credit are two national conferences, the first annotated bibliography of aviation education material and the development of teacher training courses. Many of its recommendations were so farsighted that they are still part of educational practice today.

Federal interest in aviation education began to quicken in the late 1920's when the U. S. Department of Commerce emphasized the importance of a ground school course in pilot training. From this early interest emerged the CAA's present Aviation Education Division—a department which helps schools and colleges to plan aviation courses, and also provides intra-organizational services.

The airlines belatedly got into the act in 1940 when United Air Lines established its first school and college service, followed soon after by Pan American Airways, American Airlines and Transcontinental and Western Air.

The passage of the Civilian Pilot Training Act of 1939, however, provided the real acceleration needed to adjust the schools to an emerging Air Age. This Act was the most comprehensive civilian pilot training program ever conducted by any nation. Instruction in flight, navigation, meteorology, power plants, aircraft structures, aircraft instruments, and aerodynamics were prescribed courses. At its peak, contracts were held with 884 colleges, 268 private schools, 195 high schools, 120 civic organizations and 1,250 flight school operators; with its counterpart, the War Training Service of the CAA, it turned out 500,000 trained civilian airmen. Even before Pearl Harbor, its graduates were enlisting in the Air Force at the rate of 1,000 per month; 75 per cent of the R. A. F.'s Eagle Squadron were its graduates.

From these wartime experiences it was learned that high school students were apt at developing flight proficiency, but lacked maturity of judgment and the ability to master advanced studies in navigation, meteorology and the like. Today, this is still a question upon which experts disagree. Many aviation officials and educators feel that high school students, at the peak of their ability to master flight training, should not be denied this training because of possible poor judgment. They recommend careful supervision and special emphasis on safety measures as insurance against accidents (none occurred during the wartime training program).

Nevertheless, flight training is not yet generally recommended for high school age groups. Under the Civilian Pilot Training Act, an elementary course, called pre-flight aeronautics, was set up for high schools, paralleling the more technical studies of advanced training. This is the basis of recommendations for high school

(*Continued on page* 56)

PILOT AIDS

Chocks Stop Creeping

By BOB BLATT

THESE half-circular wooden chocks fit under the wheel pants of most all planes without scarring them. Their unusual shape apparently is the reason that planes won't "creep" on their tie-downs and the chocks will not "edge out," like many of them do.

They are ten inches wide and three and one-half inches high. Painted with aluminum paint, they are easier to see at night.

Plane owners and aircraft operators should not have any trouble finding this chock material. Most veneer mills or furniture factories throw away the "hearts" of the trees, so these are likely places to look. The cypress chocks shown in the picture were the idea of Bob Neblett, Manager of the Jackson, Mississippi Municipal Airport. Allen Thomas, who has been handling planes at this field for 11 years, is shown placing the chocks at the wheels of an Air Force Cessna.

Electrical "Scotch" Tape

PILOT owners and aircraft service operators can easily solve the problem of protecting various parts of their planes from mechanical damage, scuffing and corrosion. Electrical "Scotch" tape will easily and quickly do the job. Any pilot or plane owner can apply it in a few minutes to the leading edges of struts, wings, fins and stabilizers, as well as wing tips, rudders and most any place on the plane requiring protection against the weather or leakage.

This tape is strong and very pliable, and it really sticks to any surface and stays there. Anthony Ciano, Manager of the P & B Flying Service of Pensacola, Florida, has used it extensively on his company-owned planes as well as on many privately-owned planes based with him for the past year. He says that the tape will stay in place for at least a year—which is the limit of his experience with it. The shiny black tape makes a neat appearance and even improves the looks of most of the planes on which it has been used.

In case removal is necessary, the tape pulls off almost as easily and quickly as it was applied. It is available in several widths and comes in rolls of various sizes. Most hardware and electrical stores carry it—in case your favorite aircraft service operator does not have it. The picture shows Mr. Ciano examining one of the planes.

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Aviation Education

(Continued page 54)

aeronautical courses today.

However, the Civilian Pilot Training Act paid no attention to aviation's social impact. This is the new element which has been added to postwar teaching programs. The Pilot Training Act was an emergency measure. But the postwar work of the CAA and the Civil Air Patrol can now be directed toward a broad, general indoctrination program.

Even during the war a special division of CAA directed by Bruce Uthus had started work on aviation education at the secondary school level. Their aim was to give the child a general background in aviation long before technical studies were undertaken. Major problems encountered during the war years were the preparation of instruction materials and the training of teachers in a new and untried field.

Today, the CAA gives special instruction courses to groups of teachers, including flight experience to acquaint them with the actualities of aircraft. In each of seven continental regions of the United States, a CAA representative, trained in the techniques of education, skilled in the operation of aircraft and well-versed in all aspects of aviation, is available for advice and aid in setting up school programs. Instruction materials, available through CAA, include a series of bibliographies listing sources of written material and films on all phases of aviation education—an invaluable aid to teachers. This wealth of educational material, constantly revised to keep abreast of developments in the field, represents one of the most important steps toward a coordinated school program. And it is beginning to pay off.

Since the war 41 states have taken advantage of CAA help in setting up an aviation curriculum. No surveys have been made since 1948, but in that year 49 per cent of the high schools in the U. S. were offering courses in the science of aeronautics, or were enriching science courses with aviation subject matter. Approximately 500 schools offered opportunity for flight experience—a figure which is undoubtedly much higher today.

Compared with prewar records, this is an impressive gain. But lack of funds and lack of an over-all program throughout the public school system make it fall far short of even a limited goal.

Thus far, it seems that only Russia has grasped the full implication of aviation education to its domestic and international relations, to its industrial and military operations, to its present and, above all, its future. Russian youth is already being trained in a compulsory aviation program superior to any developed in America. An entire new generation of Russians is growing up, skilled in aviation's many and varied phases.

Reports from behind the Iron Curtain reveal that aviation education is now begun in all primary grades; that actual flight training is being given to the masses. In case of war, Russia will be ready almost immediately with multitudes of skilled airmen. In an uneasy peace, Russia is placing her economic bet squarely on the basic tool of aviation. Right now, America has nothing which compares with the Russian program, nor are plans afoot to remedy the situation.

Patently, if we are to keep air supremacy, we cannot wait for a shooting war to prod us into action. On the o[ther hand] we cannot, like the Kremlin [le]aders, [de]cree that all young people shall [be train]ed in aviation. What we can do, [ini]tially, is to offer optional courses in [Ameri]can schools with the aid of federal [fu]nds as a first step (and a minimum one) toward putting us on a par with Russi[a] in aviation manpower reserves.

The goal is, of course, a comp[rehensive] program of training, beginning [in] the primary grades of all public schoo[ls]. Short of this goal, the bill I introduced [in] to Congress last year offers a minimum [program] of aviation training to high school [stu]dents in their junior and senior years.

Actual pilot training is not a part [of] my program. But the projected aeronautics course would train the student [in] skills basic to a career in aviation. Aerodynamics, theory of flight, the airplane and its engine, mechanics, engineering, meteorology, practical air navigation, map reading and flight experience would be included. Courses would be given at local airports under the supervision of their fixed base operators. Students would work with real airplanes and real aeronautical equipment, including the Link trainer.

This training, made available to thousands of high school students, would save an enormous amount of time and money in preparing for a national emergency. It would implement the present Aviation Cadet program at comparatively small cost. Today, nearly 60 per cent of Air Force cadets wash out after many months of expensive training—and it costs approximately $30,000 to train a cadet. Under this bill, unsuited students could be weeded out and dropped; students with basic knowledge of aeronautics could be trained more quickly.

The Federal appropriation for this program would be $350,000 a year for a period of five years (the cost of training only 11 Aviation Cadets per year). These funds would be furnished to the states in ratio to their population and would be matched by an equal amount from state treasuries.

The Civil Aeronautics Administrator would allot the funds and provide general direction for the program. However, appropriate State educational authorities would give the training without interference by Federal authorities.

Last year, even this minimum bill was sidetracked by Congress. If aviation education is ever to gain its proper place in America's schools, the public must be made to realize its tremendous importance and lend its active support to the measure. The record shows that the schools themselves are more than willing. Only the voting public remains apathetic to this vital need.

We cannot hope, right now, to provide the continuous instruction which is already a part of the Russian educational system. But we can start—better late than never—in the country's schools. Even in the short space of two years a broad, basic understanding of aeronautics can be taught. This first step will help produce an air-conditioned young America, ready to take its place, be it in war or in peace.

"Would you please tell Hayworth to stop jumping the gun."

CAA's Role Today

(*Continued from page 15*)

airports and of non-intersecting runways on larger airports, because of the "recognized fact that future aircraft design is toward aircraft less affected by crosswind conditions." This policy gives the CAA a wider latitude in laying out runways in such a direction as to keep objectionable noise to a minimum. It should be remembered, however, that experience has shown that real estate developments are built right to the edge of airports, and that the only way to obviate planes flying over residences is for the airport owner to buy and control the land over which approaches and take offs are to be made. This, in the case of large municipal airports is so expensive as to be out of the question. The practice has been only to acquire the land necessary for expected expansion, and for the protection of the safety of air passengers and those on the ground below. As far as small airplanes are concerned, those using Class I and II airports, the availability of the crosswind gear—now produced in a simple, lightweight and inexpensive form—definitely forecasts more care and wider judgment in laying out usable runways with less limitations by wind conditions.

Q. How do you justify such projects as the AG-1 agriculture plane which the CAA sponsors through Texas A & M College? Does this appear to be a proper utilization of government funds since it competes with private enterprise?

A. Agricultural aviation has become an essential element in national food production. Widespread conference of industry and Government officials agreed that a much safer aircraft, especially designed for agricultural purposes, was necessary. The CAA merely acted as a coordinating or catalytic agent to assist in the development of such safe, useful aircraft. CAA development of the agricultural plane was not competition with private industry. To the contrary, a dozen leading companies in the aviation industry cooperated by furnishing free such major components of the prototype as the engine, landing gear, wheels, special pilot seat and instruments and heartily approved the expenditure of CAA money for the development. In addition, the plans and specifications for the plane, all the information gained in the development contract, plus detailed information on special new design features have been made available to the entire industry for any company that wishes to manufacture the plane and sell it. The CAA will not produce more than the prototype, and has demonstrated that fact nationally to manufacturers and users who might be interested in it.

Q. We hear a lot about the British reluctance to use VOR, preferring to use the Decca system of navigation. Are there any indications that the day will soon come when airway traffic will adopt a universal system?

A. Yes, recent conferences in Europe have been encouraging. VOR is an ICAO standard. Decca is not.

Q. What about the DME equipment for eliminating the need for aircrews to establish their position on the airways?

A. DME will make the work of pilot and copilot easier and more certain. It will improve safety of navigation. Density of traffic makes it increasingly important that position reports be accurate.

Q. How are you going to handle the problems of highspeed jet aircraft on the airways?

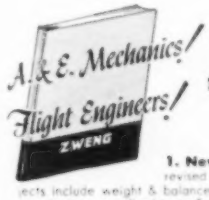
A. The CAA is handling them now, and has been for some time. They require special attention, but their speed alone creates no insuperable problems. Approach and letdown in jet aircraft can be made at speeds comparable with large piston planes providing the aircraft carries sufficient fuel. There is little difficulty solely from a traffic control standpoint. Economic operation of jets in high traffic density areas, however, will require improved aids to navigation and traffic control, and needs a great deal of further testing and study.

Q. What steps are being taken to remove unnecessary burdens on the air crews in order that they may devote their entire time to flying the aircraft?

A. In addition to aids to navigation, two other aids to the air crew are currently being developed. One is the old story of cockpit standardization, which, through the years has made slow progress against the hard and fast opinions of designers and pilots. However, it is still a goal of both military and civil officials, although we have not had much success in our promotion. We did put out a Technical Standard Order dictating the shape of the knobs on various controls, and the direction of movement. It had hardly been promulgated, however, when we learned that a further "study" on the subject is under way, and we were persuaded to await results of this study before enforcing the new designs. The TSO was suspended. The CAA is continuing its promising development of criteria for cockpit visibility. The Martin 404 already has been designed on the basis of that criteria. The project is one at our Technical Development and Evaluation Center at Indianapolis, and it is continuing. It is being carried on in close cooperation with airline pilots, and with the military.

Q. Are any constructive developments taking place to eliminate or reduce airplane noise around airports?

A. Yes, a number of constructive developments in airplane noise reduction are taking place. The NACA has studied many phases of the problem. Further studies are



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in progress. Considerable work has been done on an aero sonic muffler for the DC-3 type aircraft. Sound reducing shelters have been used with some success for engine test stands. The CAA is carrying out a three-point program to promote a more intensified and coordinated action. Local groups of CAA, airlines, military and city government officials are working together toward a solution of local city problems. The CAA will continue to make a strenuous effort to reduce aircraft noise nuisance.

Q. Do you foresee the use of passenger helicopters in shuttle flights between airports and landing platforms in cities?

A. The paper prepared by Richard K. Waldo, Transportation Economist of the CAA for the Air Coordinating Committee, entitled *Federal Policy Regarding the Development of Commercial Transport Helicopters* concludes that short helicopter airlines can be expected within three or four years between (a) the centers of large cities and the major air terminals serving them; (b) between major air terminals located close to each other; (c) between "satellite" towns and large cities; and (d) along segments of major air routes where small, intermediate communities can be connected with major air terminals. The report foresees shuttle flights from town to airport as probably the first of these uses. Los Angeles Airways already has been granted Board permission to perform this passenger service along its lines, and Helicopter Air Service at Chicago has applied for such permission. New York is planning a heliport on the roof of a downtown building. Military use of helicopters has greatly accelerated development. All helicopter production is now going to military use. How soon helicopters can be made for civil use depends on the international situation and resulting military requirements.

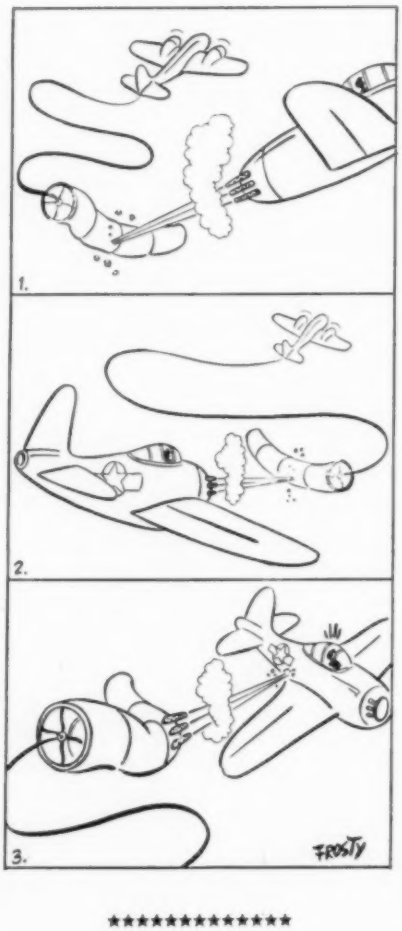
Q. Has proper airport facilities development been harmed by the restriction and allocation of scarce materials?

A. Controlled materials made available for civil airport construction in the first quarter of 1952 represent approximately 65 per cent of the stated requirements for carbon steel and approximately 25 per cent for structural steel. Reductions also were made in copper and aluminum. Despite these reductions, it is anticipated that going projects will continue and materials have been found to authorize the commencement of a number of high priority projects. Desired airport developments have been delayed because of scarcity of materials.

Q. Obviously, increased airplane speed will accentuate this problem, but in view of current passenger complaints about travel time between airports and cities, what is the future planning for airport locations?

A. It always has been the policy of the CAA to locate airports as close as possible to centers of population within the limitations of available funds, public opinion, and construction and economic considerations. The CAA single-runway policy enables sponsors to choose sites close-in to centers of population. However, because most major airports already are located, the main problem in those cases is to do whatever possible to improve the ground travel time between the city and the airport by expressways and through improved methods of handling ground traffic, such as elimination of as many traffic lights as possible. For the past two years, the CAA has had a program of bringing problems of travel-distance from cities to airports to the attention of local communities wherever possible through cooperation with State Highway Departments and the Bureau of Public Roads.

★★★★★★★★★★★★



★★★★★★★★★★★★

Q. Are plans being made for increasing runways in anticipation of jet operations? Would such plans eliminate many cities from present air service?

A. Not at the present time. Although Technical Standard Order N-6a, which sets the standards for length of runways, is constantly under study by the CAA, the present thinking is that TSO N-6a applies to civil jet, as well as present type aircraft operations as the CAA anticipates them. It is not expected, in answer to the second portion of the question, that jet operations will eliminate any cities from air service as it is anticipated that jet service between two cities will be rather long-haul and most cities that will be ultimately served by jets already have good sized airports which conform pretty well to N-6a. It is not anticipated that feeder airports, for instance, will be serviced by jets.

Q. We hear constant complaints about crowded and dirty airport facilities throughout the country. Is there anything the CAA can do, by virtue of its airport aid funds, to correct this situation?

A. Regarding crowded airport facilities, the CAA has, through its Federal Air Program, assisted whenever possible in the correction of inadequate facilities and will continue to do so within financial limits. Many new administration buildings were built or enlarged during the early years of the Airport Aid Program but for the past two fiscal years the construction of administration buildings has been curtailed and a proportionately greater percentage of Federal funds have gone into runway extensions and other items designed to improve the airport from a national defense standpoint. This policy is being continued in the present emergency in order to conserve both funds and materials. The operation and management of an airport and its facilities is the responsibility of local communities and the CAA has no authority to enforce a method of operation or management unless the operation or management is contrary to agreements local agencies have entered into to secure Federal participation in airport development. The CAA has a program of advising local communities and assisting, if possible, in between management and operating practices. The problem of dirty airport facilities is one of the major points in this advisory and educational program.

Q. What developments do you an-

ticipate **in new techniques for instrument landings?**

A. The two major types of low-approach aids in use today are a radio beam system, called the Instrument Landing System, and a radar system in which the pilot is "talked down" by a traffic controller on the ground. Where both aids are installed together, a pilot can make an ILS approach and be independently monitored by radar. The next development which we anticipate is widespread use of autopilot equipment which will fly the plane down automatically on the ILS beams. A similar system for automatic approach by radar is in advanced development stages.

Q. With increased demands for aviation gasoline by the military is there any indication of either fuel shortages or decrease in fuel quality for commercial purposes during the current emergency?

A. The first question here probably could be answered more authoritatively by the Petroleum Administration for Defense. Recent PAD orders increasing the lead content of gasoline used in most commercial aviation operations were caused by temporary shortages in high quality aviation gas stocks due to lack of refinery capacity. The increase in lead content will increase maintenance problems. For 80 octane fuel, used by most low-powered aircraft, the PAD is not requiring in excess of .05 cc of lead per gallon, so that maintenance problems of low-powered aircraft should not be seriously affected. Use of 80 octane or lower grade fuels for small aircraft or for automobiles has no relation to high octane aviation gasoline shortages since they come from different basic fuel stocks.

Q. What is the CAA doing to provide increased safety for passengers? With the increase of passenger capacity, can the passengers escape from a crashed plane?

A. CAA is working for the continuous improvement in flight safety for passengers by applying the best available technical information for developing and proposing Civil Air Regulations covering the airworthiness of the aircraft and components, operation of aircraft and performance, and medical certification of airmen. Activity for improved administration of Regulations has recently included reorganization both in Washington and in the regional offices for the separate handling of problems of air carrier safety and general aviation safety.

For the development and application of new technical information, we specifically refer you to *Survey of Research Projects in the Field of Aviation Safety Initial Report*, January 1, 1951, The Daniel and Florence Guggenheim Aviation Center at Cornell University, 2 East 64th Street, New York 21, N. Y. This Survey lists CAA projects which are being undertaken as independent and as collaborative investigations. All projects are directed toward increasing flight safety and supporting aviation. A joint CAA-CAB Group has the responsibility for developing technical information in regard to protection of passengers and air crew throughout all stages of an emergency culminating in an emergency or a crash landing. The areas which this group has been working on include structural strength of the aircraft and its instal'ations, restraining devices, structural provisions for escape from aircraft, devices for descent from airplanes landing in a gear down position, emergency instructions for passengers and passenger-handling techniques. Recently, new requirements for emergency exits have been developed which have to a considerable extent been based upon the factual data developed by the Working Group. Increase in strength of structure, such as seat installations, has resulted from activities of the Aircraft Division of Aviation Safety and the Safety Bureau of CAB. Emergency evacuation trials are being conducted by the Working Group in collaboration with ATA and the Military Air Transport. After we analyze the records of recent tests and complete a test which is now in the planning stage, we will be able to arrive at a better estimate as to limitations in passenger capacity as determined by passenger escape.

The recently published Civil Air Regulation on emergency exits has provided for planes carrying passenger loads in excess of those which are now permitted in present day types of U. S. carriers. However, there will be some limit above which the increased structural provisions will not insure adequate safety without marked advances in structural design or arrangements and in escape methods and devices. Outside markings for emergency exits are required and have been standardized.

Q. What about the increased safety of rear facing seating arrangements?

A. A proposal to reverse aircraft seats so that passengers face aft was discussed at a meeting of the Airworthiness Division of the International Civil Aviation Organization in Montreal earlier this year but it was pointed out that this would rule out other and perhaps better ways of accomplishing the same thing and the meeting agreed that no action should be taken pending further studies. END

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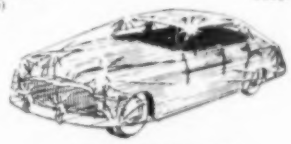

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Military News

(Continued from page 9)

made its first flight recently.

The twin jet F7U-3 was built to give the Fleet a fast shipboard fighter offering superior high altitude performance, a greater rate of climb, greater range, maneuverability and firepower.

Although larger than the F7U-1, there has been relatively little modification of the swept-wing tailless configuration. Its top speed, cloaked by security regulations, indicates it to be in the "more than 600 m.p.h." class.

The new version has a dual hydraulic control system "all the way," rather than a single power control system and the need for a separate manual control system has been eliminated.

The engineers "went all out for maintenance," aiming to reduce to a minimum the amount of time the carrier-based fighter will have to spend on deck. Tripling the number of access doors and panels, the total was increased to more than 100.

The cockpit in particular was improved and large access doors on the outside of the fuselage in the console are provided to permit work to be performed in the consoles without getting upside down in the cockpit.

The greater weight of the F7U-3 involved a switch to a heavier nose landing gear with dual wheels. The arresting hooks installation has been simplified.

RING LIGHTING

There are approximately 550 light bulbs on the giant B-36 bomber, a large proportion being used in the illumination of instrument and control panels.

What is known as "ring" lighting has been adapted as a standard for aircraft instruments by the USAF and NBA.

The new system calls for a lighting fixture around each instrument, rather than a general lighting arrangement for an entire panel of instruments.

GE has adapted miniature bulb No. 327 for the "ring" fixtures. Two of the miniature bulbs are inserted in red plastic holders at the top of each instrument. The fileters produce a red light, found to be best for dark adaptation of the eyes.

FIRST TURBO-ROTOR FLIES

The Navy Bureau of Aeronautics has disclosed that Kaman Aircraft is flying the world's turbo-rotor helicopter. The initial flight, they continued, took place at Bradley Field on December 10.

Kaman has installed a 175-hp, Boeing gas turbine in a Navy K-225 helicopter to conduct a series of flight tests of the new powerplant. The K-225 turbine installation is similar to airplane turboprop installation in an airplane only in that the turbine's exhaust is transformed into mechanical power to the rotors.

Noting a great increase in performance, the Navy feels the reduction in weight is chiefly responsible. The 'copter's piston-engine installation weighs over 500 pounds, whereby the turbine installation totals less than half that weight.

Tests will continue for an extended period to fully evaluate the characteristics of the new engine.

CORSAIR IN THE AIR

The first production model of the AU-1 Corsair, a propeller-driven attack plane designed for close support of ground troops recently made its initial flight.

Similar in appearance to the **F4U Corsair**, the AU-1 is powered by a single-stage engine. Additional armor plating has been provided to protect the pilot from ground fire and many other changes have been made internally in the airplane.

The **Corsair** is the only propeller-driven fighter-type aircraft still in production in the U. S. It was designed as an answer to the close ground-support problems encountered in Korea. The F4U **Corsair**, first developed in 1938, has been modified many times since then and after the second world war. It has been used extensively by the Marines and Navy.

MISCELLANY

General Electric has added a speedy jet fighter to its Flight Test Center in order to carry out further aviation equipment tests. The Lockheed F-94A is being loaned by the Air Force under a bailment arrangement and will be used to test automatic flight control equipment developed by the department.

The boys at MacDill Air Force Base in Tampa lost little time in nicknaming their new swept-wing B-47 Stratojet. It's "The Real McCoy," named in honor of Col. Michael N. W. McCoy, commander of the 306th Bombardment Wing.

Republic Aviation has leased huge factory facilities at Port Washington, L. I., from the Government's General Services Administration. The 216,000 sq. ft. of floor area will be used for the manufacture of wings and main assemblies of the *Thunderjet*.

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Hydra-head

(Continued from page 16)

ons on the trailing edge of the main wing structure, and by elevators on the trailing edge of the auxiliary wing.

In the Delta configuration, with the main plane's trailing edge mated with the tailplane's leading edge, the ailerons would, of course, be inoperative. Lateral control of the ship will be effected through deflectable surfaces at the wing tips. These would operate differentially, like ailerons, with one deflecting upward while the other moves downward. Pitch control will be obtained through the use of both the elevators and tip tabs acting in harmony. Directional control will be effected in the normal way, through the use of a conventional rudder surface.

A relatively simple hinge-and-gear mechanism between the main wing root and fuselage can be actuated electrically or hydraulically to change the wing position: and a manual emergency system is contemplated in case the other systems sustain damage in combat.

The fighter is expected to undergo a considerable change in longitudinal trim as the wing shifts backward or forward between the straight and Delta positions, since the center of gravity shift should be of great amplitude. Doctor Hill plans to compensate for this by using two fuselage tanks—one forward and one aft of the engine—and pumping between the two sufficient fuel to effect an equalizing weight transfer.

In view of his wide experience with tailless aircraft and control systems—he designed the "Pterodactyl" and Westland-Hill tailless fighter during the middle thirties—Doctor Hill's deceivingly simple method for controlling the Delta fighter has excited the interest of designers in America as well as Great Britain. The Hill patents have been assigned to the well-known Blackburn and General Aircraft Ltd. firms, who have the plane in the initial stages of mock-up. END

THE LIBRARY

Federal Control of Entry Into Air Transportation; by Lucile Sheppard Keyes; 392 pages; Harvard University Press; $6.

The Civil Aeronautics Act brought under government control the entry of newcomers into the field of air transportation, the inauguration of parallel services, and other aspects of competition in the industry. This book is a study of the intent and administration of the Act in terms of its economic effects.

In the first part of her book, the author lays the theoretical groundwork for her analysis and attempts to arrive at a positive criterion for market performance. Passing to the Civil Aeronautics Act and its Administrations, she then discusses the various features of the Act in their historical context and sets forth the main intent of its proponents. Part III summarizes and evaluates the C. A. C.'s regulatory policy, and provides a critical analysis of the government's subsidization policy, together with provocative suggestions for the revision.

Government regulation of America's newest and fastest-growing means of transportation is a matter of concern to many, and Mrs. Keyes' thorough study of the economics of the regulatory process should be of value and interest to persons in the air industry, in government, and to economists interested in theory, transportation policy, and the public regulation of industry.

"Jane's All The World's Aircraft" by Leonard Bridgeman; McGraw-Hill Book Company, Inc.

The 42nd edition of what is now an internationally accepted work of reference on air affairs, is as complete as ever, involving resetting of all type and introduction of almost 851 illustrations, 472 of which are new.

Large sections have been devoted to planes of the United States, Great Britain and France, with as complete information of the Soviet Union as is available. Pages covering the organization of the air forces of the world have been brought completely up to date and those on civil aviation have been revised to include full details of the functions of the International Civil Aviation Organization, the International Air Transport Association, and the International Aeronautic Federation. Also included is a list of international civil aircraft markings.

This new issue of JANE'S ALL THE WORLD'S AIRCRAFT, which since 1909 has represented a major span in the history of mechanical flight, has, as usual, been prepared with great care, and comprises the only complete and up-to-date survey of aircraft, both civil and military, of every nation in the world.

"From the Ground Up," by Sandy A. F. MacDonald; 134 pages; $2.75.

Based on the theory that a good amateur pilot should be as thoroughly trained a technician as a transport pilot, the author has written a book on aviation which covers all its phases in simplified language, starting from the ground up.

Included are sections on airmanship, theory of flight, meteorology, air navigation, radio, aero engine, airframes, and examination questions. Numerous graphs and charts accompany each section.

Written by a veteran pilot with over 5,000 hours flying experience, the book should prove of interest and help to all flyers and amateur pilots.

Air Transportation Management, by Joseph L. Nicholson; John Wiley & Sons, Inc., New York; 446 pages, $6.50.

Instead of an historical or descriptive approach, this book probes the economic aspects of day-to-day operation, as well as long term profits and losses of the airlines. Special emphasis is placed on the part the government plays in the industry.

The author's purpose in writing the book is to supply information to those who look to the airlines for a career, an investment, or rapid means of transportation. An analysis is made of the industry's policies, as well as those of the federal government.

Each chapter in the book is a complete unit and has been read for accuracy by at least four experts in the field. Mr. Nicholson states the facts. Everyone in the field may not agree, but they cannot help but find the book a frame of reference for analyzing this industry.

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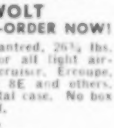

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WING TALK

CAP cadets hoist the colors and their unit flag while crew takes on gas prior to recent SARCAP. The day-long practice search mission took place in the Sacramento area as an authorized mission for all the Northern California wing, which, due to its size is split into two wings. Each SARCAP is rated by ARS, who know their stuff in aerial search.

Rescue Citation

USAF'S AIR RESCUE SERVICE has tossed another big bouquet to Civil Air Patrol for "assisting rescue operations within the continental limits of the United States and its possessions." And there were some interesting statistics to back it up. From January to October, 1951, ARS reported, CAP pilots flew 3,206 rescue sorties while regular ARS pilots were flying 850. CAP flyers logged 6,567 hours as compared to 2,575 for ARS airmen. Complete statistics for 1951 were not available when this issue of FLYING went to press.

In acknowledging CAP's outstanding service, ARS noted that "*mainly due to the existence of CAP*" was it able "*to concentrate in the Japanese area the number of aircraft and personnel*" that are now there "*without loss of operational efficiency at home.*"

Air Rescue Service pointed out also that the light aircraft flown by CAP have proved ideal for low level search operations, and that because pilots are familiar with areas surrounding their home bases search and rescue operations have been faster and more successful.

CAP at Kitty Hawk

CIVIL AIR PATROL flyers participated for the first time in the annual Wright Brothers memorial observance held at Kitty Hawk in December, when the City of Dayton's Wright Memorial Wreath was flown from Dayton to Kitty Hawk on a CAP-sponsored flight.

Lieut. Charles H. Miller, Operations Officer of the Dayton Group, accompanied by Norman Miller, of the Dayton AFA squadron, led the two-plane memorial flight in his Piper *Tri-Pacer*. George Hittle and George Wells, also of Dayton, made the trip in a Stinson *Voyager*. Despite inclement weather, the mission took less than four hours.

According to CAP headquarters, it is hoped that this flight will pave the way for increased CAP participation in the annual event. Plans are now being made to organize CAP units at Manteo and Elizabeth City so that this year the aerial pilgrimage could be a two-way affair with exchange flights to be made for ceremonies both in Dayton and North Carolina.

The 1951 memorial flight was planned by Lieut. Col. Robert J. Simons, CAP's Dayton Group Commander.

Sub Hunt

FLORIDA WING FLYERS are hunting submarines again—just for practice, of course—and reports are that they are still as good at it today as they were during World War II. For example—on a recent Friday morning, Lieut. Col. William Cogley, CO of Miami's Group I, was alerted by the Air Force that an enemy submarine had been sighted off Florida's lower east coast, heading north. The following day he received another alert and was ordered to activate a base of operations at Tamiami Airport. A "take-off and search" order came in the next morning at 0830. An hour later, the first of 17 planes took off and headed for the coast. At 1014 came the first flash: "Submarine sighted 12 miles northeast of Miami Beach—Standing By to direct Air Force." The "enemy" submarine, incidentally, was the USS CHOPPER, commanded by Commander V. Utke-Ramsing, Jr.

The sub hunters had no sooner returned to their base when another flash came from the Air Force that two men had bailed out of an AT-6 50 miles west of Miami. Back into action in a matter of minutes, the Group I flyers soon spotted the missing airmen and mobile ground rescue teams were dispatched to pick them up.

Defense Test

ONE OF THE BIGGEST CAP maneuvers of 1951 took place in December when 1,000 Civil Air Patrol aircraft from 14 Wings took to the air in a one-day exercise sponsored by USAF's Eastern Air Defense Force to test the proficiency of the volunteer Ground Observer Corps in the Northeastern United States.

Playing the role of enemy air forces, the CAP airmen provided nearly 100,000 civilian observers with the opportunity of spotting and reporting all types of aircraft. Observers' reports were relayed to filter and radar centers and USAF fighter-interceptor squadrons were sent aloft to intercept the "enemy" planes.

The day-long maneuver covered the states of Maine, Massachusetts, Rhode Island, Connecticut, New Hampshire, Vermont, New York, Pennsylvania, New Jersey, Delaware, Maryland, West Virginia, Virginia and the District of Columbia.

Wanted: A Song

THE LATEST WORD from Washington is that Civil Air Patrol needs a good marching song. So CAP flyers with special talent for putting sharps and flats together are hard at work these days, each one hopeful of coming up with a tune that will top CAP's own hit parade. Col. George S. Howard, well-known director of the world-famous Air Force Band, will head up the panel of professional musicians who will pick the winning song.

New Board Member

COL. ELLIOTT W. SPRINGS, prominent South Carolina textile industrialist, has been appointed to Civil Air Patrol's National Executive Board. The famous World War I flyer, who up to the time of his appointment was Commander of the South Carolina Wing, replaces a veteran CAP official, Colonel George D. Washburn, of North Carolina, who resigned recently.

Major General Lucas V. Beau, USAF, National Commander Civil Air Patrol, presents the Honorable Alfred E. Driscoll, Governor of New Jersey, with the first honorary membership in the Civil Air Patrol. From left to right are: Lt. Col. Nanette M. Spears, Adjutant NJ Wg CAP; Governor Driscoll; Col. Irving J. Feist, Commanding Officer, NJ Wg CAP; Maj. Genl. Beau; Brig. Genl. Chester A. Charles, ANG, Deputy Chief of Staff NJ Air National Guard; and Maj. H. W. Cumberland, USAF, Liaison Officer NJ Wg CAP.

Ike's Air Force

(*Continued from page* 11)

terference for the Red Army and satellite ground troops. If that is so, we would need some 12,000 airplanes, properly disposed, manned, and serviced for defensive tactical operations.

Equally important, these aircraft would have to be of quality comparable to the opposing Red craft. This is a very real problem for less than one percent of the 3,069 defensive fighters AAFCE could raise now can perform with the MiG on even terms. And it seems unlikely that NATO will have in quantity within two years a tactical bomber equal to the Il-26.

MDAP holds the answer. In these letters, the peoples of some 16 NATO nations spell the word "hope." MDAP is the $16½ billion blueprint for survival, through which we, over here, seek to help our allies help themselves.

Our original NATO commitments called for the Western Union countries to furnish tactical air and transport while we supplied the strategic air. Overseas bases for our operations would be made available by any of the NATO nations as the military situation required. It became apparent some time ago, however, that Western Europe could not rearm itself in time to fulfill NATO commitments. We would have to supply—in addition to the strategic bombers and fighters—the major portion of the tactical air and transport, plus considerable Navy air, to support the NATO surface forces.

Under the burden of these additional commitments, an uncertain America producing "bullets and butter" stumbled forward in March 1950 with the initial MDAP deliveries. A year later the going was easier—although we were, and are still, producing more butter than guns. As of December 1951 we have delivered to our Western Union, Middle East, and Far Eastern partners about 1,200 aircraft, plus spares and other materiel. (With this went some 200 naval vessels and smaller craft, 7,000 tanks and combat vehicles, more than 11,000 major pieces of artillery, some 11,000 general purpose vehicles, 8,225 radars and radio equipments, plus thousands of tons of crated items such as small arms and ammunition.)

Numberwise, it begins to sound like lend-lease. But this global build-up is of inordinately greater scope than our wartime program, with certain economic and political considerations, has further obstacles. Through MDAP, General Ike is building balanced *collective* forces, rather than aiding individual countries to achieve national balanced forces, as such. Each NATO signatory is supposed to contribute the full measure of its own capacity and receive MDAP assistance in the measure of its own needs. Any deficiencies in materiel, production equipment, and technical know-how are to be made good by the U.S.

The airplanes and other arms under shipment are to be used strictly for the support of Ike's forces. Such forces must be provided for in each nation's individual budget. Forces of each NATO member must be available for combat in the area and at the time specified by General Ike; or each country must have organized reserves that can be mobilized within this given period of time. No planes or other MDAP equipment is to be stockpiled at its destination. There are still other conditions: All MDAP aid represents "hardware." Any funds for housekeeping and administration will come out of the recipient's own budget. No MDAP planes will be shipped to any nation unless, or until, it has air forces in being.

These planes and materiel are moving steadily, if somewhat behind schedule. The F-84E *Thunderjet* was chosen some time ago as the standard NATO fighter-bomber. And although shipments are classified, it is known that France planned to have six *Thunderjet* squadrons in operation by last January. Holland and Belgium have in operation now small numbers of F-84Es; and these countries, as well as Denmark, Italy, Greece, Norway, and Turkey, will receive allotments ranging from 50 to 100 *Thunderjets* each.

The F-86E *Sabre* figures prominently in plans for General Ike's Air Force as the standard NATO interceptor. Within the next 18 months, Great Britain is scheduled to receive from the U.S. about 500 "E" *Sabres* under MDAP to supplement her own slow production of new models such as the Supermarine Swift. The *Sabre* will reportedly be built elsewhere in Europe with British-built engines. And under special licensing agreements Canada is building for England about 400 additional F-86Es, for which the British will supply their own engines. For her own use, meanwhile, Canada is producing still another 400 *Sabres*.

These planes will gradually replace the *Meteors*, *Spitfires*, and *Vampires* as they become available to the NATO forces.

Another American craft available through MDAP, is the Lockheed P2V-5 *Neptune*, some of which have already been assigned to the RAF for specialized, anti-submarine work.

To prepare NATO airmen and maintenance personnel for the proper operation of these planes and other materiel, a widespread MDAP training program is in force. With the first small shipments of planes went American "mobile training teams" and tech reps to provide on-the-scene instruction.

MDAP training emphasizes the instruction of individuals and cadres who, upon their return to units in their respective countries, can instruct these nationals in the use of American aircraft and weapons. More than 12,000 NATO officers and enlisted personnel have been trained thus far at U.S. service schools here and overseas, and plans call for the accommodation of 14,000 more this year. About 4,800 of those trained to date are air trainees, and 1,388 are enrolled at 21 USAF bases in this country. Shepherd AFB has the largest number of NATO students at this writing, with 244; Williams AFB 176, Kessler AFB 155, Perrin AFB 143, Goodfellow AFB 113, Scott AFB 92, with smaller numbers in attendance at the other facilities. While a few are pilots or specialists seeking instructional training, or familiarization with specialized aircraft such as the P2V-5, the majority are young cadets who get essentially the same type of flight or mechanical training afforded American cadet officers or enlisted men.

Canada is contributing to the effort by reviving her war-time Commonwealth Training Scheme. Some 1,100 British and other NATO cadets are enrolled there in

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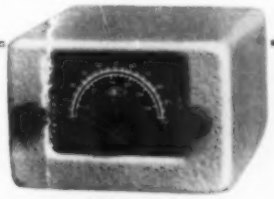

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flight training. In furtherance of this preparation, we are including in MDAP shipments to Ike and Norstad a large number of T-33A jet trainers and miscellaenous other types such as T-6G *Texans*.

Naval activity within the NATO framework is a subject in itself; but it might be mentioned here that we sent to France and Holland under MDAP numbers of war-surplus carrier aircraft for use aboard the flattops of these countries. France is scheduled to get a number of the new F4U-7 *Corsair* fighters in the near future. As her own MDAP contribution, England has loaned to France, the Netherlands, and Canada a carrier each. There is the probability, also, that these countries and Belgium may have the use of several American CVE-type carriers taken from mothball storage.

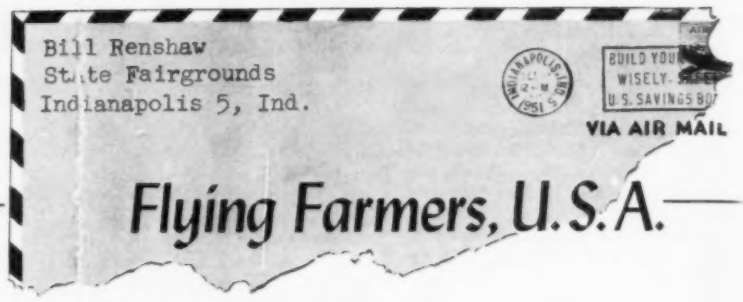
The naval air picture would take on considerable significance in any contingency. Our Mediterranean 6th Fleet aircraft would operate alongside such units as Italy, Greece and Turkey might raise. This total force, under Maj. Gen. David M. Schlatter, would constitute the Southern Air Force. Our Atlantic Fleet planes would be joined by those from Britain's six flattops and the aircraft from France's, Belgium's, and Holland's two carriers each. These aircraft would be supported by Norwegian units to form the Northern Air Force under Maj. Gen. Robert K. Taylor.

In the meantime, as these plans materialize, Ike and Norstad and their respective staffs do a masterful job. The Supreme Commander—which, in great contrast to his one-time counterpart, he does not like to be called—has inspired in the austerity-ridden peoples of Western Union a remarkable "will to fight." His air commander has achieved wonders of another sort with one of the toughest tasks he faces—standardization of equipment. The planes that took part in *Operation Cirrus* were manned by not only six nationalities but used five different types of radio command sets. For the all-important ground communications, five different national types of teletypes had to be, somehow, interconnected. So did the some number of internation ground radios and radio relay standbys.

The supply problem is a nightmare. The mixture of jet and piston fuel complicates things sufficiently. But, in addition, most of the airmen and ground crewmen talk in terms of "litres." Moreover, even those who talk in terms of "gallons" can't get together. Our British cousins refer to Imperial gallons, which are larger than U.S. gallons.

These are minor points of difference compared to some of the higher-level headaches: What uniforms and equipment of which nation will be selected for NATO airmen? How will they be paid, and how much? What about food, an "official" language, and length of service?

It is little wonder that General Ike told the recent meeting of NATO Council Ministers that the building of his forces amounted to "doing the impossible," but that we would all have to do just that "or else. . . ." END



Flying Farmers, U.S.A.

NEW HOME

The National Flying Farmers Association has settled on Wichita, Kans. as its new home. Office will presumably be left in Stillwater, Okla., until a headquarters building is readied on the new Municipal Airport at Wichita.

* * *

FLYING MOTHER'S DAY

Following up their campaign to sell flying by giving free rides to non-flyers, midwest flying farmers are now planning special flights on Mother's Day, with a good chance that Dads will get the same treatment when father's time to be recognized rolls around.

Plan calls for each and every flying farmer in Indiana, Illinois and Wisconsin to take a mother for a plane ride on Mother's Day. FF's may take any mother they choose so long as she has never been up in an airplane, either commercial or private.

Officers of this group of FF's recently voted a citation to all flying farmers who go out of their way to promote private flying. The group will be called "Ambassadors of Aviation." First presentation will be made at the Flying Farmer Clinic, to be held at the University of Illinois about the middle of April.

* * *

AIRPORT SHORTAGE BLAMED

Slightly less than 10 per cent of the flying farmers contacted in a nation wide poll conducted by this column agree that the 27 per cent drop in private flying can be charged to a shortage of airports and landing strips. Going to the "grass root" of private flying this column finds flying farmers in strong disagreement with the Cornell University report which charged that the drop-off which has occurred since 1948 was caused largely by insufficient airports and landing strips.

Thirty per cent of the FF's who responded felt that the short supply of airports was probably a fifty-fifty factor in the decline. The remaining 60 per cent listed it as a very minor factor, if a factor at all.

Typical of the 60 per cent was Gilbert M. Chappell, Batavia, New York, who gave slackening off of the G. I. program as the big reason for the drop.

"These G. I.'s," Chappell concluded, "found themselves unable to continue flying because of financial reasons." The high cost of living was also cited as one reason for the 27 per cent drop. Paul S. Schenk, Memphis, Missouri, put it this way: "with living costs so high, the average man has to cut out a lot of expenses."

In calling attention to the Cornell statement one of our survey questions asked "if the drop-off wasn't due to a lack of airports and landing strips, what in your estimation was primarily responsible for this sag?"

The 60 per cent who did not think the number of airports had much to do with the drop, advanced a variety of reasons for the recession in private flying. Henry H. Hoyer of De Smet, North Dakota, charged that the annual inspection and the graft that goes with it are the chief reasons for the drop in private flying. "Most people," Hoyer concludes, "don't relish spending from $3,000 to $20,000 for a piece of equipment to be torn apart at random and unnecessarily."

"Bad conditions at the small airports" are responsible for the drop-off in the opinion of Stanley Baker, Marion, Ohio, who adds, "and old junk airplanes."

Wismer Holland of Valdosta, Georgia, seemed to sum up for the 60 per cent by terming the present-day lightplane "a fragile white elephant." Advancing a remedy for most of the ills of private flying, Holland said, "a good roadable airplane can be built immediately. People," he added, "just won't own a white elephant (non-roadable plane) that has to be left out at an airport like a motor boat at some distant lake."

Pointing out that after he had his *Ercoupe* designated "Experimental" he folded its wings and drove it hundreds of miles, Holland said, "I am thoroughly convinced that roadability is the real answer to the many problems which kill the enthusiasm of private pilots and light plane owners."

Holland now has a patent pending on a device that he says would fold the wings on a high wing plane in half a minute. "It could," he asserts, "be adapted to a Piper *Tri-Pacer*, with the aileron controls remaining connected with the wings in the folded position."

Holland would power the *Tri-Pacer* on the road with a light engine; that, because of its weight, would reduce the pacer to a two-place airplane. "It would," he concluded, "be a compact roadable plane that could go anywhere, anytime and be kept at home in the garage."

Four out of every 10 flying farmers queried believe that a flying machine with many of the Helicopter features is the best bet to solve the problems which beset the average flying farmer. Henry Hoyer added up the arguments of this group with: "it would eliminate to a large extent our next greatest problem—that of being afoot after landing, as the landing area could be close-in."